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VOLUME 54

NUMBER 3

New Denture Development Opposes Porcelain Uppers to Plastic Lowers

MYERSON AND SEARS POSTERIORS SOLVE PROBLEMS OF BOTH MATERIALS

One-tenth Wear Loss of Plastic-to-Plastic

The opposition of porcelain teeth to plastic has proven in the laboratory and clinically to be ten times as wear-resistant as plastic-to-plastic. This unexpected result depends on the proper application of a well-known scientific principle: The coefficient of friction between unlike materials is often less than between like materials. This is the same principle that makes the diamond needle the best to use for maximum life of phonograph records.

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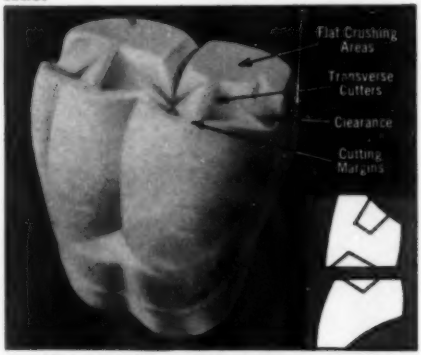
Increased Stability and Efficiency

The design of the new Myerson and Sears Posteriors also provides for stabilizing the denture and for efficient mastication. Side-to-side stability is achieved by having all the flat crushing areas located in the lingual half of the occlusal. All the cutting areas are located in the buccal half. Since crushing requires so much more force than cutting, the major force is directed to the lingual side.



Shows details of occlusal construction of new Myerson and Sears posteriors. Insert drawing shows how upper and lower meet in one plane.

Front-to-back stability is also a feature of this new design. Also, direct escapes for the food are provided. Setting up and achieving balanced articulation have been made easy. For further information and technique write for booklet. Address: MYERSON TOOTH CORPORATION, Cambridge 39, Mass.

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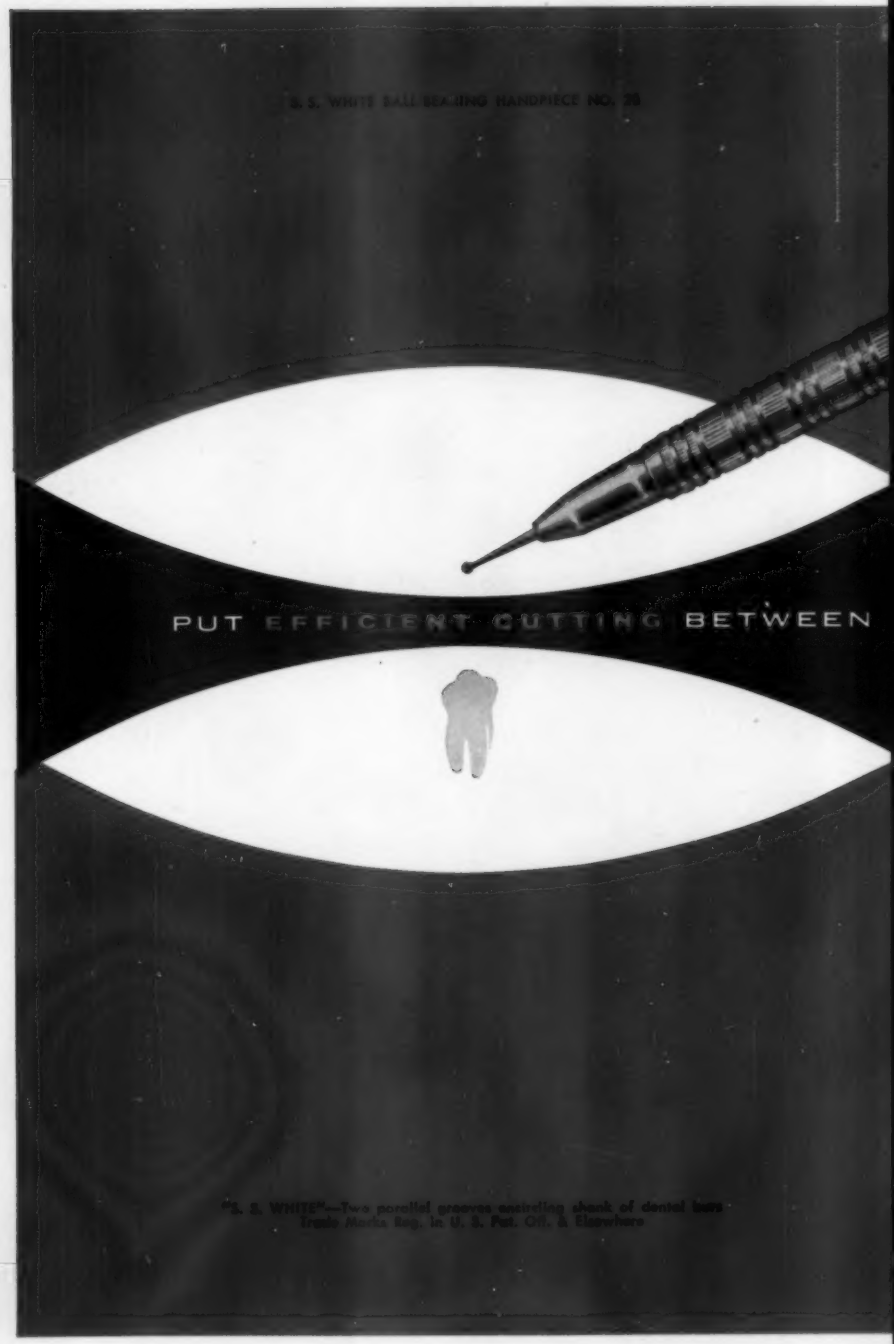
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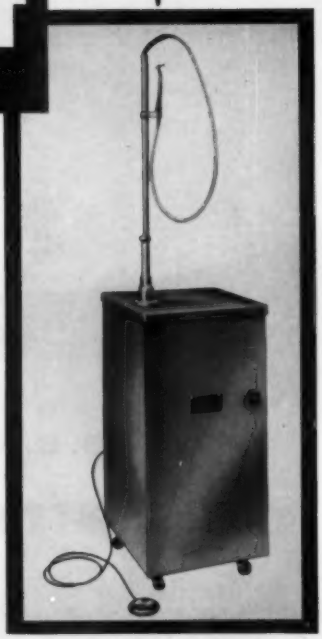

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*JADA Vol. 47, P. 324-329, Sept. 1953. NELSEN, R. J., D. D. S.: PELANDER, C. E.: KUMPALA, J. W.: Hydraulic Turbine Contra Angle Handpiece. (Reprint on request).

*JADA Vol. 52, P. 426-428, April 1956. PHILLIPS, R. W., M. S.: PAFFENBARGER, G. C., D. D. S.: Research on Dental Materials.

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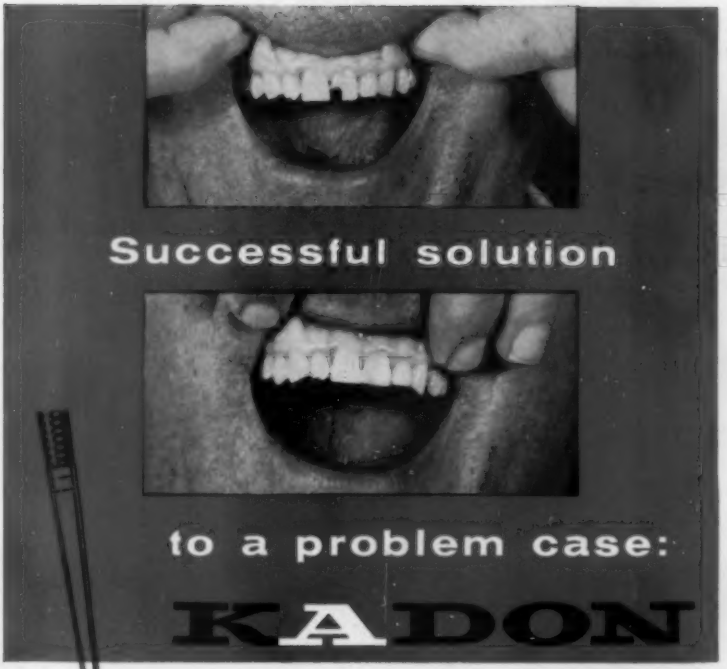

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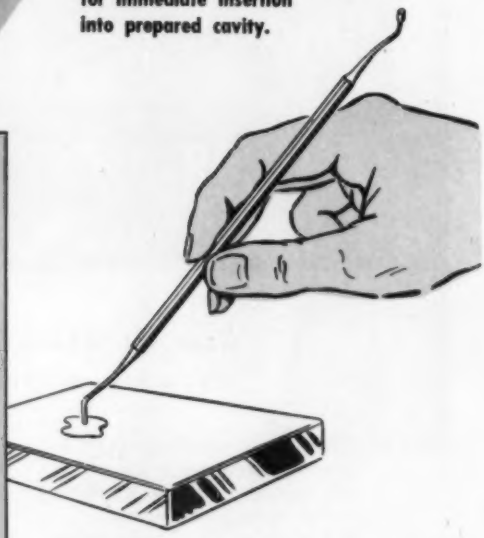

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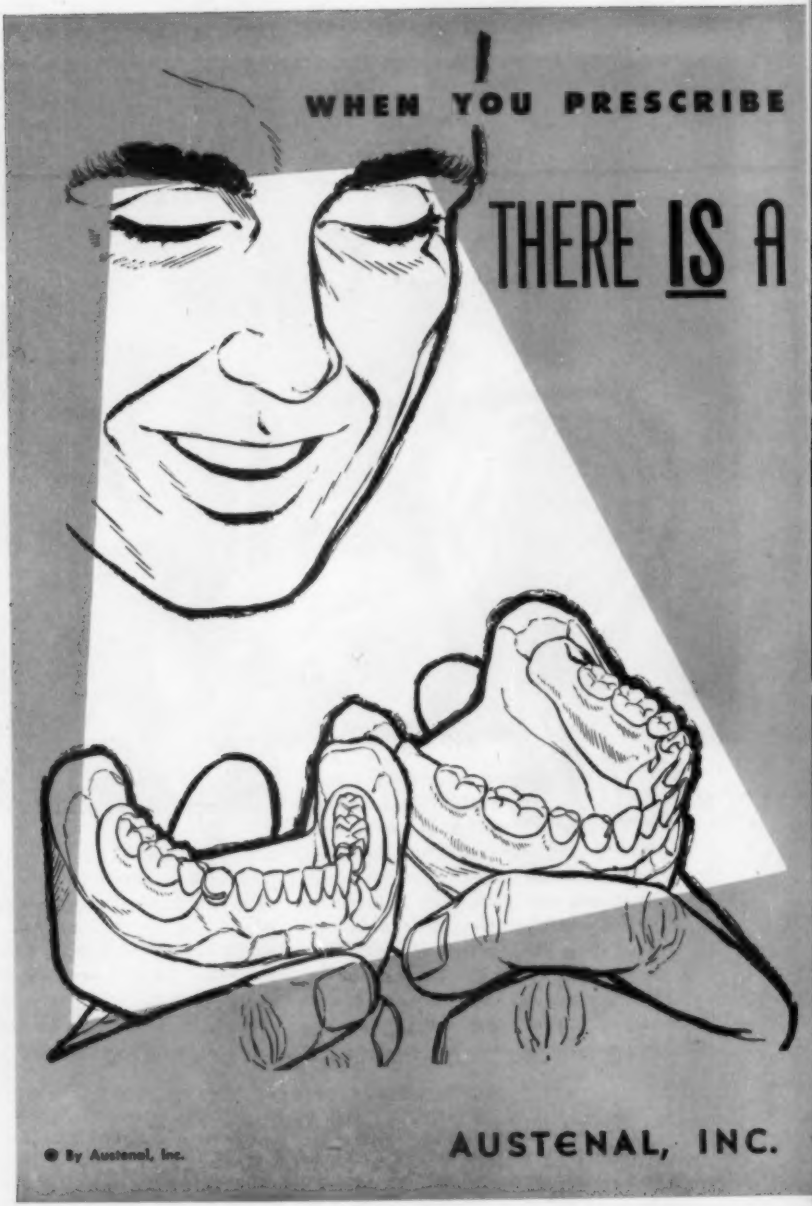
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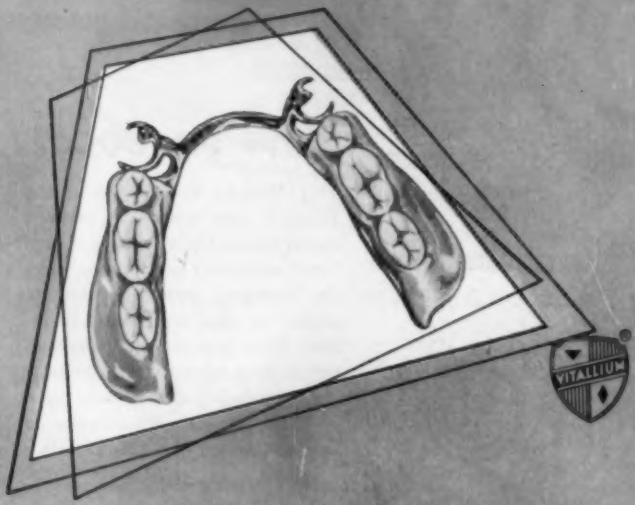

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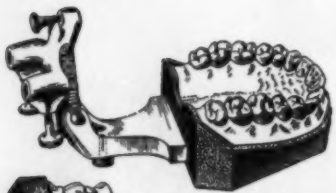

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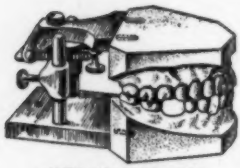

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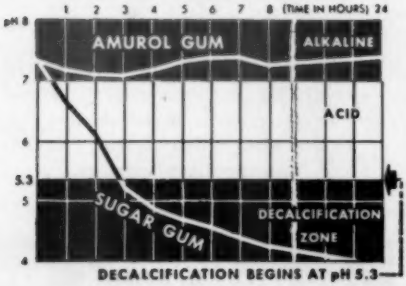

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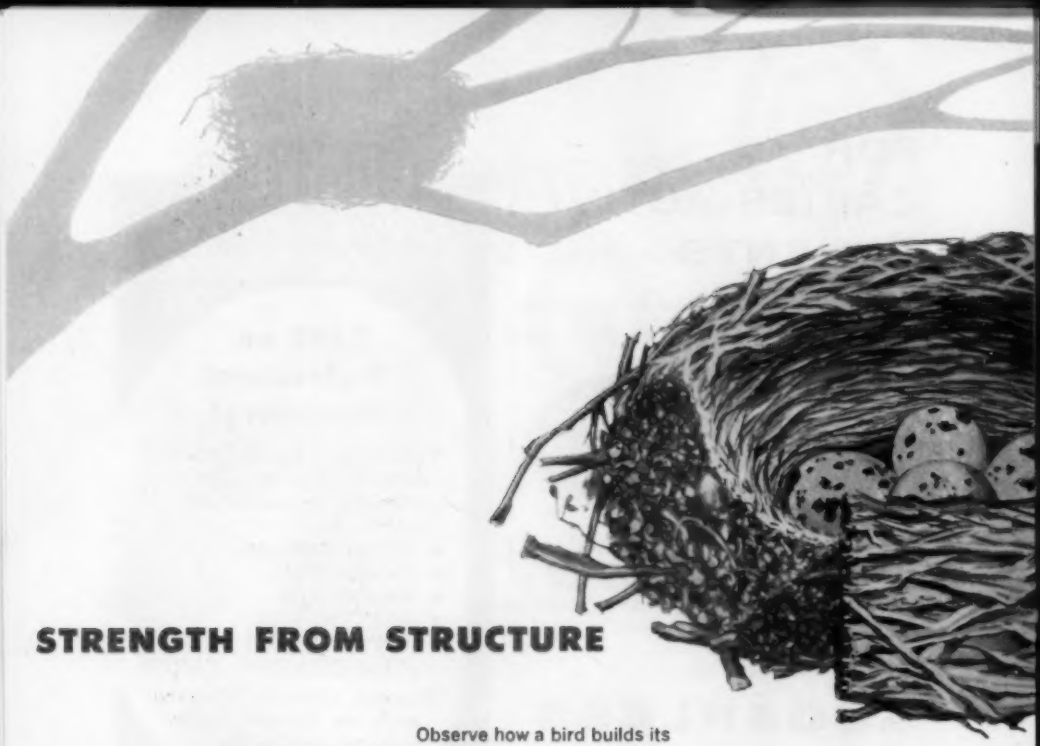

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MARCH 1957 THE Journal OF THE AMERICAN DENTAL ASSOCIATION VOLUME 54 • NUMBER 3

Research on dental amalgam and its application in practice

Ralph W. Phillips, M.S., Indianapolis

Of all the materials used in dentistry, none has more appeal to the laboratory or clinical researcher than amalgam. The many facets of its chemistry, metallurgy, physical properties and manipulation all hold interest. For example, although amalgam has been in use as a restorative material for over 100 years, the chemistry of its setting reactions is not completely understood as yet. Likewise, most of the variables involved in its manipulation need further study. The intricacies of the material and its prominent role as the most widely used restorative material still make it a fertile field for investigation.

Contrary to popular belief, the past few years have been fruitful ones in increasing understanding of amalgam and the factors that influence its properties and its clinical success. Some of this work has been basic research that may lead eventually to improved alloys and technics. For example, roentgen ray diffraction studies[1-3] are isolating the true identity of the compounds formed during the setting reaction and the exact role of mercury in these complex changes. These various phases are also being studied by means of electrical conductivity measurements.[4] Research[5] has also been devoted to detecting the degree of penetration of various ions from the alloy into the enamel and dentin. Still other workers[6-11] have attacked the general

Associate professor and chairman of department of dental materials, Indiana University School of Dentistry.

1. Ryge, G.; Moffett, J. A., and Barkow, A. G. Microstructural observations and x-ray diffraction studies of silver-tin amalgam. J.D. Res. 32:152 April 1953.

2. Frankel, C. B., and Fankuchen, I. Investigation of the chemistry of dental amalgam by roentgen ray diffraction. J.A.D.A. 44:542 May 1952.

3. Mitchell, J. A., and others. Some factors affecting the dimensional stability of the silver-tin-(copper-zinc) amalgams. J.Res.Nat.Bur.Standards 52:185, 1954.

4. Phillips, R. W., and Schnell, R. J. Unpublished data.

5. Massler, M., and Barber, T. K. Action of amalgam on dentin. J.A.D.A. 47:415 Oct. 1953.

6. Phillips, R. W.; Schnell, R. J., and Phillips, L. J. Measurement of electrical conductivity of dental cement. I. Method and values for dry specimens. J.D. Res. 33:400 June 1954.

7. Phillips, L. J., and others. Measurement of electrical conductivity of dental cement. II. Values for specimens exposed to moisture. J.D. Res. 34:51 Feb. 1955.

8. Phillips, L. J.; Schnell, R. J., and Phillips, R. W. Measurement of electrical conductivity of dental cement. III. Effect of increased contact area and thickness; values for resin, calcium hydroxide, zinc oxide-eugenol. J.D. Res. 34:597 Aug. 1955.

problem of galvanic action in the oral cavity as associated with amalgam and other metallic dental materials. Space does not permit a discussion or evaluation of these, and other, fundamental studies, yet it is from research of this type that far reaching advances of a most practical nature may come. This paper, however, will confine itself to recent developments that have a more immediate relation to the clinical restoration.

CAUSE OF FAILURE

There is always much argument concerning which is the best restorative material. Such time could be better spent in discussing what factors contribute to a good amalgam or inlay or foil. Although amalgam must be recognized as an excellent material, failures are seen daily in the dental office. These failures may involve recurrent caries, fracture, dimensional change and excessive tarnish and corrosion. Roper[12] analyzed the cause of failures from restorations seen in the service. Healey and Phillips[13] studied over 1,526 amalgam failures and found that approximately 56 per cent could be attributed to faulty cavity preparation, whereas 40 per cent were traced to improper manipulation of the alloy. Their data, and that of Roper, indicate that the success or failure of this material rests in the hands of the dentist, and that both proper cavity preparation and correct manipulation are essential to clinical success. It is with the approximately 40 per cent that fail because of improper manipulation that this paper will largely be concerned.

THE ALLOY

With the advent of the American Dental Association Specification No. 1, inferior alloys virtually disappeared from the market. Therefore failure of the restoration can no longer be blamed on a poor material but rather on improper use of a basically good alloy. Selection of brand will rest primarily on personal preference in regard to setting time, ease of manipulation, carvability, and so on.

In recent years there has been a definite trend toward the use of alloys having smaller particle sizes, and this change has been beneficial. Since the bulk of the finished restoration is composed of particles of the original alloy surrounded by mercury and mercury-tin and mercury-silver phases, the original grain size alters the character of the finished carved or polished surface. This is well demonstrated in Figure 1 where the carved surfaces prepared from thoroughly triturated mixes of large and small grained alloys are compared. It would seem logical that the smoother surface of the small grain alloy would be less susceptible to tarnish and corrosion and would be better adapted to the cavity walls. Crowell and Phillips[14] have also shown that when all other manufacturing variables are carefully controlled, there is a definite relation between strength and grain size—the smaller the grain, the higher is the one hour and 24 hour strength. Thus, in any alloy small grain size would seem to be preferred. Further work along the line of that done by Jarabak[15] and Smith[16] would be helpful in isolating the effect of grain size on other physical properties.

9. Phillips, L. J., and Phillips, R. W. Measurement of electrical conductivity of dental cement. IV. Extracted human teeth; in vivo tests; summary. J.D. Res. 34:839 Dec. 1955.

10. Nachlin, J. J. Type of pain associated with restoration of teeth with amalgam. J.A.D.A. 48:284 March 1954.

11. Schriever, W., and Diamond, L. E. Electromotive forces and electric currents caused by metallic dental fillings. J.D. Res. 31:205 April 1952.

12. Roper, L. H. Restorations with amalgam in the army: an evaluation and analysis. J.A.D.A. 34:443 April 1, 1947.

13. Healey, H. J., and Phillips, R. W. Clinical study of amalgam failures. J.D. Res. 28:439 Oct. 1949.

14. Crowell, W. S., and Phillips, R. W. Physical properties of amalgam as influenced by variation in surface area of alloy particles. J.D. Res. 30:845 Dec. 1951.

15. Jarabak, J. P. Effect of particle size on dimensional change in dental amalgam. J.A.D.A. 29:593 April 1942.

16. Smith, E. A. Particle size of dental amalgam alloys. Brit.D.J. 86:34 Jan. 21, 1949.

EFFECT OF MERCURY

Probably no one factor has a more profound influence on the physical properties of amalgam than the eventual residual mercury content of the restoration. The original work by Gray[17] in 1919 which showed that mercury content was related to strength has been furthered by recent studies[18, 19] which increase considerably knowledge regarding this relationship. (Some of the early reports dealing with this particular problem are to be questioned because of inaccurate chemical methods employed in determining the mercury.)

Analysis of clinical amalgam restorations[18-20] shows a wide variation in residual mercury, ranging as high as 70 per cent. The mercury is invariably greater at the critical marginal areas,[19] usually 2 to 3 per cent. Current knowledge seems to indicate that there is no cause for alarm if the residual mercury can be held to approximately 50 per cent. Above this level, however, the danger of a serious loss in strength becomes increasingly greater. For example, with one commercial alloy,[19] a compressive strength of 40,000 lbs. per square inch at a residual mercury content of 55 per cent dropped to only 18,000 lbs. per square inch when the mercury rose to 59 per cent.[19] A strength of 18,000 lbs. per square inch would not be adequate to resist normal biting stress. Unfortunately, restorations containing residual mercury above 55 per cent are observed frequently.

Knowing then that the residual mercury alters the resistance to fracture, what factors influence the amount of mercury left in the restoration? These factors are: (1) original mercury-alloy ratio, (2) amount of trituration, and (3) condensation pressure and time. Certainly the mercury-alloy ratio is one variable that should and must be controlled. It has been shown clearly[19, 20] that, regardless of condensation pressure, the more mercury used in the original mix, the greater is the amount which will remain in the restoration. Thus some type of weighing device must be employed.

Insufficient trituration results in a fast-setting amalgam from which less mercury can be expressed. Likewise the particles of the original alloy are not thoroughly bonded by the mercury, and a weaker amalgam framework is established. The final result then is lowered strength and increased flow.[21, 22] Under-trituration must be avoided, not only because of the lower strength which results regardless of the brand of alloy, but because the finished surface will be rougher and more susceptible to tarnish and corrosion. There is adequate clinical data to demonstrate that under-amalgamation results in an inferior restoration.[23, 24]

The fact that increasing the condensation pressure will decrease the residual mercury and thus the resistance to fracture is well established.[19, 25, 26] Whether hand or mechanical condensation is used, the pressure must be adequate to remove the excess mercury that is required to make the workable mix.

Amalgam should not be allowed to

17. Grey, A. W. Metallographic phenomena observed in amalgams. J.Nat.D.A. 6:513 June; 909 Oct. 1919.

18. Crawford, W. H., and Larson, J. H. Dental restorative materials; amalgams, acrylics. J.D. Res. 33:414 June 1954.

19. Swartz, M. L., and Phillips, R. W. Residual mercury content of amalgam restorations and its influence on compressive strength. J.D. Res. 35:458 June 1956.

20. Phillips, R. W., and Swartz, M. L. Mercury analysis of one hundred amalgam restorations. J.D. Res. 28:569 Dec. 1949.

21. Phillips, R. W., and Boyd, D. A. Importance of mercury-alloy ratio to amalgam filling. J.A.D.A. 34:451 April 1, 1947.

22. Taylor, N. O. Amalgam technic: dependable and dangerous practices. J.A.D.A. 17:1880 Oct. 1930.

23. Phillips, R. W., and others. Clinical observations on amalgams with known physical properties. J.D. Res. 22:167 June 1943.

24. Phillips, R. W., and others. Clinical observations on amalgam with known physical properties—final report. J.A.D.A. 32:324 March 1945.

25. Ward, M. L., and Scott, E. O. Effects of variations in manipulation on dimensional changes, crushing strength and flow of amalgams. J.A.D.A. 19:1683 Oct. 1932.

26. Taylor, N. O., and others. Effects of variable factors on crushing strengths of dental amalgams. J.D. Res. 28:228 June 1949.

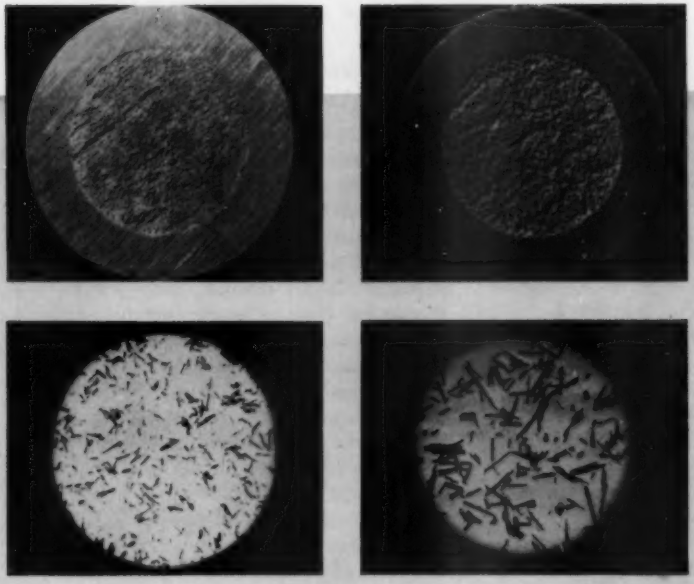

Fig. 1 • Carved surfaces prepared from small and large grained alloys

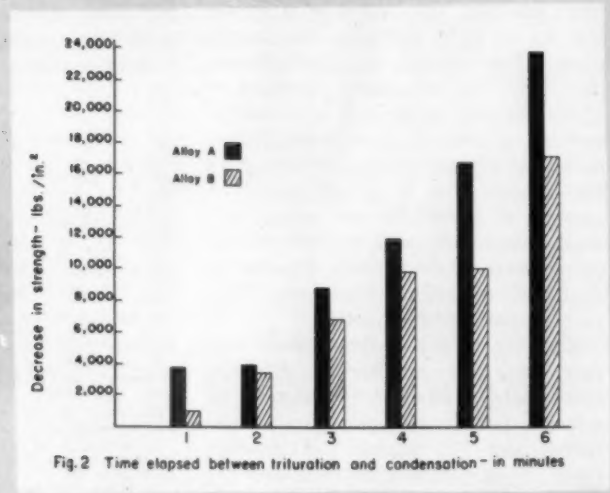

Fig. 2 Time elapsed between trituration and condensation - in minutes

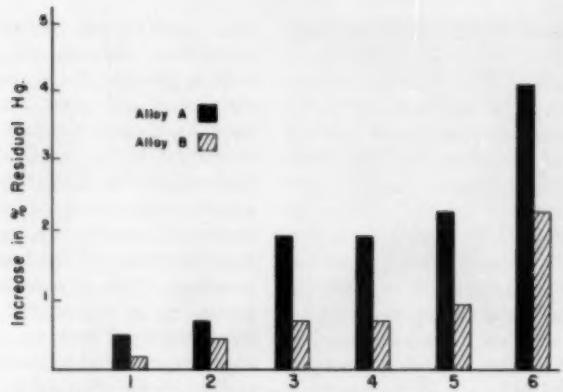

Fig. 3 Time elapsed between trituration and condensation - in minutes

stand too long before its condensation into the cavity preparation. Harvey[27] and Mosteller[28] both set the maximum time limit for safe condensation at three minutes, whereas original work by Ward[29] indicated that more mercury was retained in specimens packed with amalgam five minutes old than in specimens which were condensed immediately. The newer technic of using drier increments for building the restoration[28, 30-32] and the advent of faster setting alloys make this problem a greater one today. In order to secure additional data on this variable, the following series of tests were made.

TESTS

Two representative commercial alloys, one fast setting and one slow setting, were selected. Trituration was standardized by mechanical amalgamation and all specimens were condensed by a static loading of 2,000 lbs. per square inch. After completion of the mix, specimens were prepared at one minute intervals up to maximum time of six minutes. No mercury was expressed from the mix before condensation. A minimum of six specimens was prepared at each time interval.

The average loss in compressive strength, as compared with the value for specimens condensed immediately, can be seen in Figure 2. It is obvious that as the amalgam is allowed to stand before condensing, the strength decreases proportionally. The loss is greater and more rapid with the faster setting alloy (A). When these specimens were analyzed for residual mercury (Fig. 3), it was found that the mercury increased as the mix was allowed to stand and was greater for the faster setting brand. These data confirm the previous observations that amalgam which has partially set should not be used. The loss in strength due to the excess residual mercury is significant. Sev-

27. Harvey, W. Some recent research into dental amalgams at the R.A.F. Institute of Aviation Medicine, Farnborough, Hants. Brit.D.J. 81:245 Oct. 18, 1946.

28. Mosteller, J. H. Principles of condensation of amalgam. J. Georgia D.A. 24:10 July 1950.

29. Ward, M. L., and Scott, E. O. Further studies of the effect of variations in manipulation on dimensional changes and flow of amalgams. J.A.D.A. 22:1164 July 1935.

30. Sweeney, J. T. Amalgam manipulation: manual vs. mechanical aid. Part II. Comparison of clinical applications. J.A.D.A. 27:1940 Dec. 1940.

31. Miller, E. C. Clinical factors in the use of amalgam. J.A.D.A. 34:820 June 15, 1947.

32. Romnes, A. F. Amalgam restorations: a critical survey of present-day practice. Internat.D.J. 4:1 Sept. 1953.

eral mixes must be employed for large restorations.

There is still much to be learned about the influence of the mercury-alloy ratio on other properties of amalgam and the relationship of this variable to the many factors associated with condensation. The best work in this area is being done by Ware and Docking.[33] Although it is generally believed[34] that excess mercury also increases the susceptibility to tarnish, more laboratory and clinical evidence are needed to establish this exact relationship. In general, however, the role of mercury in the clinical behavior of the amalgam restoration cannot be overemphasized.

TRITURATION

The previous section has stressed the importance of thorough trituration. Underamalgamation, as demonstrated in Figure 4, left, must be avoided. The strength is low, fracture and fraying of the margins may result, and tarnish will be greater. If trituration is carried to the approximate consistency shown in Figure 4, right, strength will be at a maximum, the amalgam handles smoothly, working time is adequate and the carved surface will be more resistant to deterioration.[23, 24, 31] The length of time required to reach this consistency depends on many variables such as the size of the mix, condition of the mortar and speed of trituration. Trituration, therefore, must be standardized according to the conditions present in each office. Certainly recognition of the proper appearance of amalgam when thoroughly triturated is imperative. There is no evidence that mechanical trituration produces a mix or restoration that is superior to one produced by a careful hand technic; however, mechanical trituration does tend to standardize the procedure in the average person's hands.[35] Herein, then, lies the real advantage of this device. Individual amalgamators will vary in their efficiency and rate of amalgamation.[26]

It is true that the degree of trituration does influence dimensional change on setting; for example, the longer the mixing time, the less will be the expansion. There is, however, no evidence to indi-

33. Ware, A. L., and Docking, A. R. Effect of manipulative variables on dental amalgams. Austral. J.Den. 58:283 Oct.; 355 Dec. 1954.

34. Skinner, E. W. Science of dental materials, ed. 4. Philadelphia, W. B. Saunders Co., 1954.

35. Phillips, R. W. Physical properties of amalgam as influenced by the mechanical amalgamator and pneumatic condenser. J.A.D.A. 31:1308 Oct. 1944.

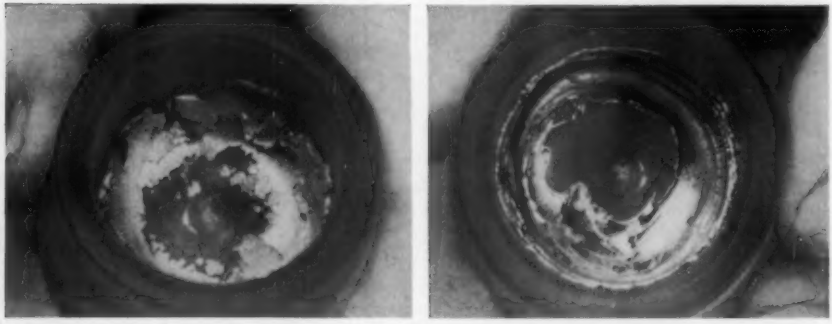

Fig. 4 • Left: Undertriturated mix. This consistency results in low strength, increased flow and rough carved surfaces. Right: Thorough trituration produces optimum properties and superior clinical restoration

cate that the reduced expansion or possible few microns contraction as detected by laboratory tests is clinically significant. Observations on clinical restorations[23, 24] placed from thoroughly triturated amalgams and also with a special alloy fabricated to produce excessive contraction[36] failed to reveal a single instance of open margins or recurrent caries. The restorations placed with the thoroughly amalgamated mix proved superior in terms of surface condition and marginal adaptation. This seems to bear out the opinion of Roper[12] and others[30, 31, 37] that it is better to err on the side of too much than too little trituration. The so-called "ditched" filling, an example of which is shown in Figure 5, is often attributed to contraction of the alloy when it is more probably caused by insufficient extension or width in the cavity preparation, poor condensation which leaves this vital area rich in mercury, or a thin feather ledge of amalgam left after carving.

It is possible that the percentage of clinical restorations inserted daily that would actually show a positive expansion is fairly low. Mechanical devices for mixing and condensing amalgam tend to reduce the setting expansion,[35] and these auxiliary aids are now widely used. Ware[38] noted that only 25 per cent of a group of Australian dentists succeeded in producing expansion when using their routine office procedure. However, these observations must not be construed as a recommendation for a contracting alloy or a haphazard technic. They merely emphasize that small dimensional changes, as measured by present laboratory methods, may not be clinically significant, and that the real danger in the trituration of amalgam lies in the many inferior properties resulting from under-amalgamation.

EFFECT OF MOISTURE

Excessive expansion[39] of amalgam due to moisture contamination is a definite clinical problem. Approximately 16 per cent of all failures can be attributed to this phenomenon.[13] The zinc present in most alloys dissociates the water and liberates hydrogen gas. The resulting expansion, which may be as great as 500 microns per centimeter, produces overhanging margins that invite recurrent caries. Likewise, the resulting voids which are formed produce a 25 per cent reduction in compressive strength.[40] Thus there is no alternative but to maintain a dry field and to avoid handling the amalgam with the hands. Of course, this contamination must occur during trituration or condensation, and saliva immediately coming in contact with the packed surface has no deleterious effect.

Fig. 5 • Restoration showing marginal failure

In the past two years, several nonzinc alloys have been introduced. At the present time these materials have to be con-

36. McDonald, R. E., and Phillips, R. W. Clinical observations on a contracting amalgam alloy. J.D. Res. 29:482 Aug. 1950.

37. Mosteller, J. H. Important considerations in the mixing of silver amalgam. New York J. Den. 24:310 Aug.-Sept. 1954.

38. Ware, A. L. Report on a survey of the treatment of silver alloy amalgams. Commonwealth Bur.Den.Stds. Report, 1951.

39. Schoonover, I. C.; Souder, Wilmer, and Beall, J. R. Excessive expansion of dental amalgam. J.A.D.A. 29:1825 Oct. 1942.

40. Phillips, R. W.; Swartz, M. L., and Boozayaangool, Rith. Effect of moisture contamination on compressive strength of amalgam. J.A.D.A. 49:436 Oct. 1954.

sidered as experimental. There is no real data available to indicate whether they are superior. Since zinc is used to act as a scavenger for oxides, the manufacture of a nonzinc alloy is probably a more delicate process and requires more care on the part of the manufacturer. Properly done, the alloy seems to have essentially the same physical properties as a zinc-containing alloy.

A series of tests were made on three representative popular commercial zinc and nonzinc alloys from the same manufacturer. The compressive strength, both at one hour and 24 hours, was measured as well as the flow. Trituration was done in accordance with the manufacturer's directions. The specimens were condensed by a mechanical packing device at 2,000 lbs. per square inch. The mean data for a minimum of five specimens can be seen in the table. The compressive strength for the regular and nonzinc alloys of manufacturers A and C are comparable. The flow for the nonzinc alloy from manufacturer C is somewhat higher. This is also true for alloy B and the one hour strength is lower for the nonzinc material. The difference probably can be attributed to a slower setting alloy. It should be remembered that the maximum limit for flow established in the A.D.A. specification is 4 per cent, and all alloys meet this requirement. Thus, at least for the three alloys that were tested, no great difference was detected in the strength properties for the nonzinc and zinc alloys from the same manufacturer. The nonzinc alloys tend to be somewhat dirtier in handling than zinc alloys, but there is no sound correlation between this observation and clinical properties or behavior. On this basis, however, some have suggested that they will tarnish more rapidly. Whether this type of alloy will be more or less resistant to tarnish has not been determined, and any conclusions as yet are premature.

Table • Compressive strength and flow for nonzinc and zinc-containing alloys from same manufacturer

Material	Strength—lbs. per square inch		
	One hour	24 hours	Flow—%
Alloy A			
Regular	17,000	39,000	1.5
Nonzinc	16,000	39,000	2.2
Alloy B			
Regular	17,500	43,000	2.0
Nonzinc	10,000	43,000	3.1
Alloy C			
Regular	9,000	41,000	2.8
Nonzinc	9,000	37,000	3.8

Certainly, whenever the occasion arises that moisture contamination cannot be prevented, the zinc-free alloy should be used. It is to be hoped that the use of these new materials will not lead to a false sense of security[39] on the part of the dentist using them. Moisture is always to be avoided, regardless of the composition of the alloy.

CONDENSATION

Evaluation of hand and mechanical condensation will not be discussed in this article. With regard to the exact method of using each increment in building the restoration, various technics are advocated. A recent study[41] has shown little difference in the final physical properties of specimens that were prepared by the so-called increasing dryness technic from those prepared with drier portions throughout. It is important to note that increments should never be used that are too wet or sloppy. A sufficient amount of mercury must be removed to provide a mass that offers resistance to the condensing instrument. Likewise, the amalgam should never be squeezed so dry that mercury cannot be worked to the surface during the packing procedure.

41. Swartz, M. L., and Phillips, R. W. Study of amalgam condensation procedures with emphasis on residual mercury content of increments. I. Strength, flow and dimensional change. J.D. Res. 33:12 Feb. 1954.

Sweeney[42] and Miller[43] have both cautioned against the laminating effect and surface roughness produced from use of such a consistency. A recent report[44] by a Swedish investigator has also emphasized the superior adaptation achieved by condensing with small rather than large increments.

Matrixes will not be discussed herein. From the standpoint of dental materials, however, recent research[45] has evaluated various matrix retainers and technics in terms of the actual reproduction of the tooth contour. It has been shown that wedging and contouring of the band are essential, regardless of the retainer used, in order to minimize cervical overhang and reproduce as nearly as possible the proximal contour. In another facet of this study, it was indicated that wedging of the band assists in removing excess mercury, particularly at the cervical and proximal margins.

It has been stressed repeatedly in this article that all effort in the manipulation of amalgam must be exerted to minimize the residual mercury content of the restoration. Even with optimum results, one of the inherent weaknesses in the amalgam restoration is lack of strength. This is particularly true during the first few hours. Many alloys at the end of one hour have attained only 10 or 15 per cent of their eventual maximum strength.[46] Thus an alloy which will have a 24 hour strength of 50,000 lbs. per square inch may be only 8,000 lbs. per square inch at the end of one hour, even if properly manipulated. The exact amount of strength necessary to resist fracture during mastication is not known, but certainly 8,000 lbs. per square inch is most inadequate. The revised A.D.A. specification may require a 24 hour strength of at least 42,000 lbs. per square inch as well as a minimum one hour requirement. Thus, although the cavity preparation may be adequate, carving and manipulation correct, accidental or intentional stress during the first few hours will lead to fracture and eventual failure. The patient must be cautioned in this regard, and the suggestion of a liquid diet for the next meal is probably a sound one.

MARGINAL ADAPTATION

Recent work[18, 47, 48] with radioactive isotopes has changed our entire idea of the degree of marginal adaptation of restorative materials. This laboratory tool has shown that no restorative material has perfect adaptation to the cavity walls. Leakage can be demonstrated with all. Less has been observed with amalgam than with any restorative material, and the penetration apparently decreases as the restoration ages. It is reasoned that metallic ions and corrosive products may fill in this area slowly, and penetration of fluids is thereby prevented. It is also suggested these ions may also have some bacteriostatic effect. Further study in this area could well be devoted to factors which influence marginal adaptation; these would include condensation procedures, trituration, particle size of the alloy and temperature changes. The effect of temperature is of particular interest in view of the recent investigation of Nelsen and his co-workers[49] who showed vividly the phenomenon of

42. Sweeney, J. T. Improved technic for packing and condensing uniform amalgam restorations by hand. J.A.D.A. 28:1463 Sept. 1941.

43. Miller, E. C. Clinical procedures which affect amalgam restorations. North-West Den. 27:173 Oct. 1948.

44. McHugh, W. D. Experiments on hardness and adaptation of dental amalgam as affected by various condensation techniques. Brit.D.J. 99:44 July 19, 1955.

45. Phillips, R. W., and others. Proximal contour of Class II amalgam restorations made with various matrix band technics. J.A.D.A. 53:391 Oct. 1956.

46. Phillips, R. W. Compressive strength of amalgam as related to time. J.D. Res. 28:348 Aug. 1949.

47. Armstrong, W. D., and Simon, W. J. Penetration of radiocalcium at margins of filling materials: a preliminary report. J.A.D.A. 43:684 Dec. 1951.

48. Sausen, R. E.; Armstrong, W. D., and Simon, W. J. Penetration of radiocalcium at margin of acrylic restorations made by compression and noncompression technics. J.A.D.A. 47:636 Dec. 1953.

49. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at margins of dental restorations. J.A.D.A. 44:288 March 1952.

marginal percolation due to the difference in the coefficient of expansion of the restoration as compared with that of tooth structure. This differential permits ingress of saliva at the margins when the clinical restoration is subjected to gross temperature changes. Although the exact clinical significance of these observations is not yet known, it is interesting to note that, from this aspect, amalgam again is superior to most other restorative materials.

SUMMARY

Amalgam still remains the most commonly used restorative material. This fact, plus the many desirable properties which amalgam possesses, contributes to the continual research activity in this area. Basic studies related to adaptation, phase changes during setting and electrical conductivity may lead eventually to significant clinical advances. For more immediate direct application, the following points can be enumerated:

1. Use of small grained alloys permits better handling characteristics, smoother surface and a stronger alloy.

2. There is now information on the exact relationship of residual mercury to compressive strength. Loss in strength is extreme at the high levels often found in the clinical restoration, particularly at the marginal region. Excess mercury can be minimized by using the manufacturer's mercury-alloy ratio, triturating thoroughly, condensing with adequate pressure and by not using amalgam that has partially hardened.

3. Laboratory and clinical evidence indicates a real danger from under-trituration of amalgam.

4. Moisture contamination still remains a common cause of failure. Contamination by saliva or mulling produces severe expansion and sharp reduction in strength. The nonzinc alloys seem to possess properties that are comparable to those of zinc-containing alloys. Whether they will be more or less resistant to tarnish is yet to be determined.

5. The resistance of any amalgam restoration to biting stress is low during the first few hours after insertion. The patient must be warned against accidental or intentional biting forces during that time.

6. Research with radioactive isotopes indicates that although perfect adaptation to the cavity wall is never attained with any restorative material, amalgam is inferior to none.

The amalgam restoration remains a fascinating and fertile area for research. As with all dental materials, it is extremely susceptible to many manipulative variables. Its clinical success is dependent on meticulous attention to detail.

History of Science • No history of civilization can be tolerably complete which does not give considerable space to the explanation of scientific progress. If we had any doubts about this, it would suffice to ask ourselves what constitutes the essential difference between our and earlier civilizations. *George Sarton, Introduction to the History of Science, vol. 1, p. 3.*

The natural incisal guidance

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The study of occlusion is important in every branch of dentistry. In the treatment of the teeth and their overlying structures the dentist almost always is concerned with occlusion, either directly or indirectly. In almost every instance serious pathological conditions in the mouth will either be caused by changes in the occlusion, or will result in changes in the occlusion.

Hanau[1] illustrated that there were five interrelated factors for consideration of the laws of articulation. These factors are the inclination of the condylar guidance, the inclination of the plane of orientation, the prominence of the compensating curve, the cusp height and the inclination of the incisal guidance.

In complete denture construction total limitations are set by only the inclination of the condylar guidance. The other factors are more or less under the control of the operator, when he constructs an occlusal scheme which he believes will adequately distribute harmful stresses.

In the natural denture the problem is much more difficult, because the operator faces certain limitations when he considers any of the five interrelated factors. The natural incisal guidance presents particularly difficult—but not insurmountable—obstacles in the handling of problems of occlusal stress distribution.

The angle of incisal guidance is formed by an imaginary line drawn from the incisal edges of the maxillary incisors to the incisal edges of the mandibular incisors, with the occlusal plane. The angle of guidance will vary with the relationship of the overbite to the overjet. For purposes of discussion, there exist four possibilities. When there is no overbite, the angle will be 0 degrees regardless of the overjet (Fig. 1). If the overjet is great with little overbite, the angle of incisal guidance will be small (Fig. 2). If the overbite and the overjet are average, it can vary from steep to moderate (Fig. 3). Finally, if the patient has a deep overbite with negligible overjet, the incisal guidance angle will be great (Fig. 4).

These conditions may be accompanied by average vertical opening and freeway space, or with less than average vertical opening and concomitant increase in freeway space. Often, but not always, the freeway space is directly proportionate to the overbite.

ENDOGENOUS ORIGIN OF DEEP OVERBITE

Deep overbite is indigenous to a steeply inclined incisal guidance. It is this condition that presents the greatest difficulty

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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1. Hanau, R. L. Full denture prosthesis—intraoral technique for Articulator Model H. D. Outlook 17:499, 1930.

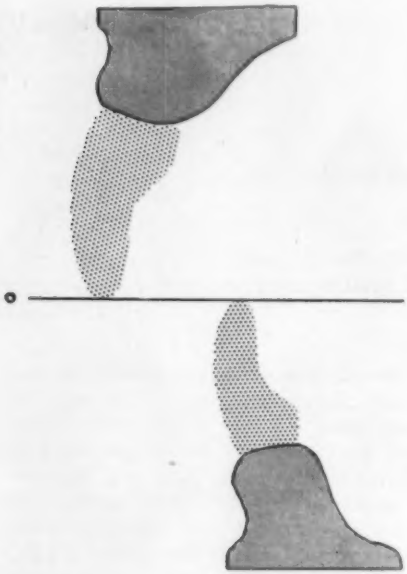

Fig. 1 • Angle of incisal guidance when there is no overbite, will be 0 degrees, regardless of overjet. O: Occlusal plane

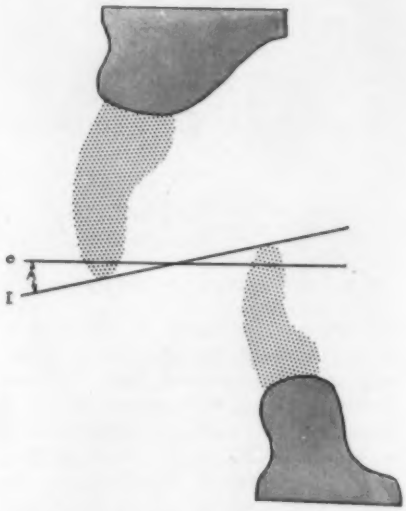

Fig. 2 • Small angle of incisal guidance with great overjet but little overbite. O: Occlusal plane. I: Incisal guidance. A: Angle of incisal guidance in relation to occlusal plane

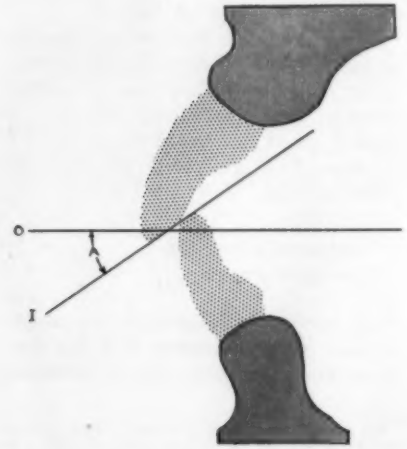

Fig. 3 • Angle of incisal guidance with relation to occlusal plane when overbite and overjet are average. O: Occlusal plane. I: Incisal guidance. A: Angle of incisal guidance with relation to occlusal plane

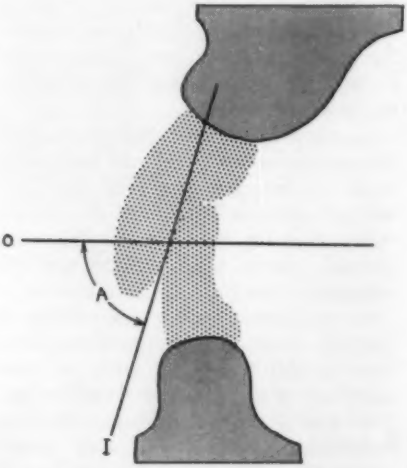

Fig. 4 • Angle of incisal guidance in relation to occlusal plane in deep overbite with negligible overjet. O: Occlusal plane. I: Incisal guidance. A: Angle of incisal guidance with relation to occlusal plane

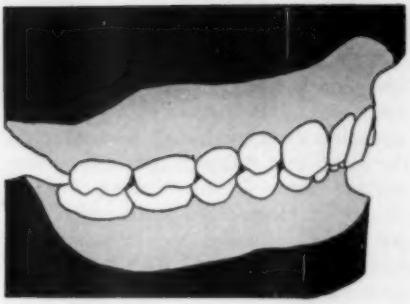

Fig. 5 • Deep overbite with little overjet, resulting from exogenous factors

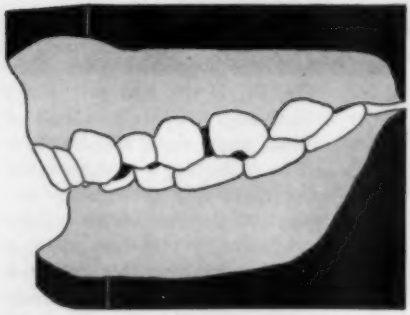

Fig. 6 • Deep overbite with little overjet, resulting from loss of bicuspid

when it is found necessary to modify the natural occlusion in order to prevent or treat breakdown of the supporting structures of the natural or artificial denture. Deep overbite with little overjet may be found in normal jaw relationship (Angle Class I) and orthognathous relationship (Angle Class II Division 2 malocclusion). In order to evaluate a patient with a deep overbite, it is necessary to determine his rest and occlusal vertical dimensions. Many of these patients have less than average occlusal vertical opening.

Brodie[2] states that the morphological pattern of the craniofacial complex is constant. In 1942 Brodie and Thompson[3] demonstrated that the relationship of the mandible to the rest of the craniofacial complex is established long before the eruption of the teeth. If these theories are true, the spatial position of the mandible can be predicted. Thus, the location of the chin and subsequently, the amount of freeway space can be foreseen.

The origin of deep overbite in malocclusion associated with normal jaw relationship may vary. It may be present as a result of heredity. The vertical occlusal position of the molars and bicuspids depends on the balance of the muscles affecting the mandible. This muscle balance is predetermined as a result of genetic background.

Normally the favorable eruption sequence in the mandible is cuspid, first bicuspid, second bicuspid and then second molar. The lower permanent cuspids must erupt first to maintain normal arch length and to prevent lingual collapse of the anterior segment. This anterior collapse is often associated with a deep overbite. If the first bicuspid erupts first, the cuspid will experience difficulty in erupting, particularly if the deciduous cuspid is lost prematurely. This is likely to result in some lingual collapse of the anterior segment and mesial tipping of the first bicuspid.

EXOGENOUS ORIGIN OF DEEP OVERBITE

The anterior region of the dental arch can be easily influenced by exogenous factors. These include lip-sucking, tongue-sucking, pillowing and other conditions which bring pressure to bear on the anterior teeth. An abnormal amount of stress in this area may tend to move the maxillary teeth incisally and lingually, causing a deep overbite with little overjet (Fig. 5).

2. Brodie, A. G. On the growth pattern of the human head, from the third month to the eighth year of life. Am. J. Anat. 68:209 March 1941.

Loss of teeth in the posterior region may set up a syndrome which will terminate in a deep overbite with little overjet (Fig. 6). If the first permanent molar is lost, the bicuspids proximating the edentulous space move distally. This is followed by a shifting and subsequent flattening of the dental arch in the anterior region. This flattening is toward the side from which the posterior tooth is lost.[4] If loss in the mandible causes a shifting of the mandibular anterior teeth, it may leave the maxillary anterior teeth unsupported. The maxillary anterior teeth are then subjected to the muscular forces of the orbicularis oris muscle. This pressure will cause them to move incisally and lingually. The resulting situation is an excessive amount of overlapping of the anterior teeth. Such a situation will result in a deep overbite with little overjet.

The loss of a mandibular anterior tooth may result in a similar syndrome. The orbicularis oris muscle acts on the maxillary segment, which in turn delivers vector forces to the mandibular anterior arch. The arch of the mandibular anterior teeth is reduced to an arch with a smaller radius. Then the pressure of the lower lip on the maxillary incisors moves them incisally and lingually. The result of this movement is an excessive overbite with little overjet.

In some instances, metabolic processes affecting development may result in a lack of vertical growth in the molar and bicuspid region. This, together with exogenous factors, may produce a deep overbite.

In another type of malocclusion associated with orthognathous relationship (Angle Class II Division 1), excessive overbite is coupled with appreciable overjet. The etiology of this type of malocclusion includes hereditary potentials, childhood thumbsucking, lip-biting, tongue-biting, nail-biting and abnormal upper respiratory function such as mouth breathing.

CONTROVERSIAL FACTORS OF DEEP OVERBITE

There doesn't seem to be complete agreement on all the etiologic factors that result in a deep overbite. Diamond[5] made the claim that ramus height is the influencing factor in establishing vertical dimension. He said that if the ramus does not grow vertically, the intermaxillary space will not increase. This inhibits the continuous active eruption of the deciduous posterior teeth, but does not interfere with the continuous eruption of the anterior teeth. The result is insufficient vertical opening with a deep overbite.

After a cephalometric study of the effect of inadequate ramus height on vertical dimension, Wylie[6] concluded that Diamond's observations were not substantiated. He did conclude, however, that adequate growth of the mandibular ramus is of great importance to harmonious facial lines.

In malocclusion associated with orthognathous jaw relationship (Angle Class II Division 2) the overbite is usually associated with an infraocclusion of the bicuspids and molars. Dunn[7] describes this type of malocclusion as one with arrested vertical development in the molar and bicuspid regions. As a result, the soft tissue lingual to the maxillary incisors acts as an inclined plane. This can result in a lingual tipping of the mandibular incisors, which may arrest the anterior development of the mandibular arch or force the mandible distally.

The lower lip normally rests against the labial surface of the mandibular in-

3. Brodie, A. G., and Thompson, J. R. Factors in the position of the mandible. J.A.D.A. 29:925 June 1942.

4. Salzmann, J. A. Effect on occlusion of uncontrolled extraction of first permanent molars: prevention and treatment. J.A.D.A. 30:1681 Nov. 1943.

5. Diamond, Moses. The ramus as a factor in the development of the dental height. (Abst.). J. D. Res. 22:346 Aug. 1943.

6. Wylie, W. L. The relationship between ramus height, dental height, and overbite. Am. J. Orthodont. & Oral Surg. 32:57 Feb. 1946.

7. Dunn, Robert. Vertical overbite or arrested vertical development in molar and premolar region. Internat. J. Orthodont. & Oral Surg. 12:685 Aug. 1926.

cisors and the incisal third of the labial surface of the maxillary incisors. In the situation described by Dunn, the muscular forces of the lower lip are brought to bear on only the labial surfaces of the maxillary incisors. This causes them to shift lingually and incisally.

CLINICAL SIGNS OF INSUFFICIENT VERTICAL OPENING

Insufficient vertical opening may result in a number of clinical signs. These signs will help in the diagnosis of this condition. A noticeable bony ridge lingual to the molars and bicuspids may be present. The molars and bicuspids may appear inordinately short because of the close approximation of the gingival tissue to the occlusal surfaces. There may be missing teeth, an exaggerated curve of Spee, contracted arches and a malalignment of teeth.

PHYSIOLOGIC CONSIDERATIONS OF NATURAL INCISAL GUIDANCE

Considerable time has been given to the study of the dynamic aspects of occlusion. It has been pointed out by one investigator[8] that the chewing cycles are affected by the cusp height of the posterior teeth. It is felt by another[9] that the apparatus used to record this jaw movement might have had a considerable effect on the recorded result.

The study of the functional movements of the masticatory apparatus is still new and there is still much to be learned. It seems, however, that the chewing cycle is controlled by proprioceptive and exteroceptive reflexes stimulated by the height of the cusps and the apparatus used in the experiments that have been carried out. These same reflexes could be stimulated repeatedly and perhaps to some extent conditioned by a steeply inclined incisal guidance. This might influence the chewing cycle to a greater extent than cusp height, especially if there is considerable overbite with little overjet. In these instances the maxillary and mandibular anterior teeth will contact each other before the posterior teeth in eccentric positions. This might stimulate the reflexes and result in a more vertical chewing cycle.

The nonfunctional movements, created in part by nonspecific, psychogenic stresses of modern living, can be extremely damaging to the supporting structures of both natural and artificial dentures. When these stresses are concentrated on a few teeth, the damage will be magnified proportionately. The slightly inclined or 0 degree incisal guidance makes it easier to balance the occlusion (Fig. 1, 2 and sometimes 3). The balanced articulation then will distribute the stresses set up by these nonfunctional movements more adequately. The aim in handling these conditions should be stress distribution. Stress concentration should be avoided. The problem of stress distribution is considerably greater with a steeply inclined incisal guidance and in many instances can be accomplished only by modification of this relationship.

STEEPLY INCLINED INCISAL GUIDANCE IN TREATMENT

In the natural denture, occlusion may exist which would not be acceptable for artificial dentures. For example, patients with a steeply inclined incisal guidance in their natural denture may go through life without any pathologic manifestations. It may be that there exists a biologic balance between the tissues of the temporomandibular joint, the muscles of mastication and the tissues supporting the teeth. On the other hand many patients with the same type of incisal guidance may exhibit pathological symptoms.

8. Payne, S. H. Comparative study of posterior occlusion. J. Pros. Den. 2:661 Sept. 1952.

9. Jankelson, Bernard; Hoffman, George M., and Hendron, J. A., Jr. Physiology of the stomatognathic system. J.A.D.A. 46:375 April 1953.

These symptoms may or may not be associated with loss of teeth or perverted habits affecting the dental arches. Exogenous conditions added to this type of occlusion can destroy what might otherwise be a physiologic state of equilibrium.

The presence of steeply inclined incisal guidance in complete denture prosthesis presents a difficult problem. If it is not in complete harmony with the other four factors of occlusion,[1] the patient will produce a damaging shearing action when he moves his mandible laterally, especially into protrusive position. This steeply inclined guidance makes it more difficult to harmonize the occlusion. A lack of harmony can disturb the stability of the denture and cause a more rapid breakdown of the supporting structures. The temporomandibular joint may also become involved.

One of the authors[10] pointed out the difficulty of balancing the natural occlusion for 26 per cent of 512 patients examined at the Naval Hospital in Philadelphia. In these patients, the jaws were limited to centric position because of a steeply inclined incisal guidance. He also found that 19 per cent of the patients had free lateral excursion of the mandible, but were limited in their protrusive movement.

In approximately 45 per cent of the patients examined it was found that the natural incisal guidance was so steeply inclined that ideal distribution of occlusal stresses was impossible without modification. This modification is not always possible or even desirable. For instance, in a young patient with no symptoms of periodontal breakdown, it is questionable whether it would be desirable to attempt a reduction in the inclination of the incisal guidance, even in conjunction with the construction of a prosthesis. A steeply inclined incisal guidance presents a considerable problem in stress distribution both to the prosthodontist and the periodontist.

It seems desirable to consider modification of the incisal guidance in the natural denture when there is evidence of periodontal breakdown, especially in the upper incisors, when this breakdown can be attributed to excessive lateral occlusal stress, or when a prosthesis exerts excessive lateral force. A prosthesis may exert excessive lateral force if the labial surfaces of the mandibular incisors contact initially the lingual surfaces of the replacement maxillary incisors deflectively during the mandibular excursions.

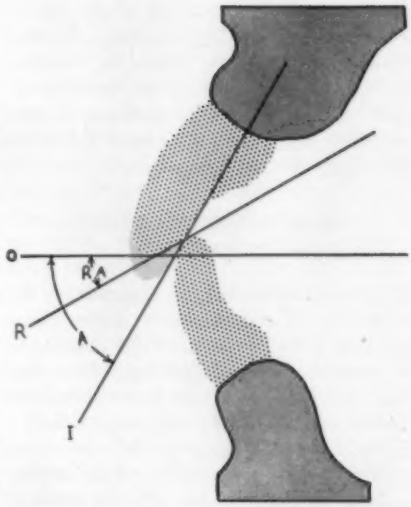

Fig. 7 • Diagrammatic sketch of method for reducing angle of incisal guidance by raising incisal edges of maxillary incisors. O: Occlusal plane. I: Original incisal guidance. R: Reduced incisal guidance. A: Original angle of incisal guidance with relation to occlusal plane. RA: Reduced angle of incisal guidance with relation to occlusal plane

MODIFICATION OF INCLINATION OF INCISAL GUIDANCE

There are several methods that might be employed to modify the inclination of the

10. Collett, H. A. Variations in natural occlusion and their significance in the construction of prosthetic restorations. J.A.D.A. 40:59 Jan. 1950.

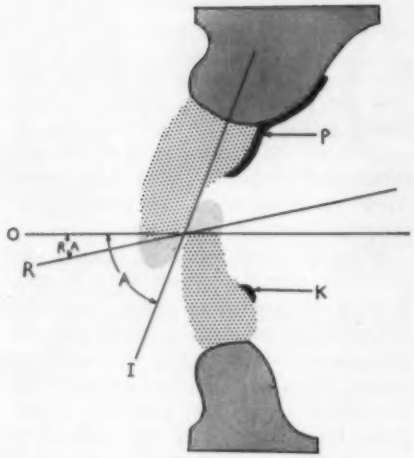

Fig. 8 • Diagrammatic sketch of method of retention used to prevent process of continuous eruption of teeth. In illustration, parts of removable dentures are used as retainers. O: Occlusal plane. I: Original incisal guidance. A: Original angle of incisal guidance with relation to occlusal plane. P: Removable lingual plate. K: Kennedy bar. R: Reduced incisal guidance. RA: Reduced angle of incisal guidance with relation to occlusal plane

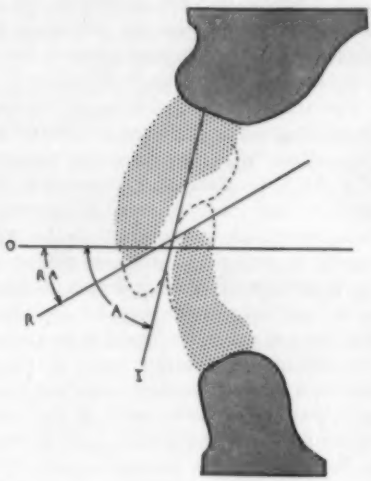

Fig. 9 • Diagrammatic sketch of method of reducing angle of incisal guidance by increasing occlusal vertical dimension. O: Occlusal plane. I: Original incisal guidance. R: Reduced incisal guidance. A: Original angle of incisal guidance with relation to occlusal plane. RA: Reduced angle of incisal guidance with relation to occlusal plane

incisal guidance. First, the incisogingival dimension of the maxillary crowns might be reduced. Next, the incisogingival dimension of the mandibular crowns might be reduced. Third, the vertical dimension might be increased. All these methods will reduce the inclination of the incisal guidance, making the problems of occlusal stress distribution less difficult; however, each method presents problems, which, if not handled properly, may lead to serious complications.

The simplest method is to raise the incisal edges of the maxillary incisors to reduce the incisogingival dimension of the crowns. This might be accomplished by simple grinding. The maxillary incisors will not be taken out of occlusion with the mandibular incisors so extrusion or exfoliation will not result (Fig. 7). If this method is not accompanied by some type of restorative dentistry, however, the teeth may be left uncomfortably sensitive.

The second method, reducing the incisogingival dimension of the crowns of the mandibular incisors, might also be accomplished by simple grinding. This procedure, however, would solve the problem for only a short time, for the process of continuous eruption will cause the lower incisors, once they are out of occlusion, to extrude. This method must be accompanied with a procedure that will prevent extrusion. Extrusion can be prevented by placing crowns or three-quarter crowns on the maxillary incisors to restore the occlusion, or by placing a continuous lingual clasp (Kennedy bar) on or above the cinguli of the mandibular incisors, to retain them. The Kennedy bar might be part of a mandibular partial replacement. This Kennedy bar would be satisfactory in conjunction with a complete maxillary replacement; however, if

natural maxillary teeth are taken out of contact, it would also be necessary to retain them with a lingual plate or Kennedy bar over their cinguli (Fig. 8).

The third method, that of increasing the occlusal vertical dimension, should be approached with considerable caution (Fig. 9). The patient's rest vertical dimension and the amount of freeway space is extremely important if this approach to incisal guidance modification is to be considered. With a steeply inclined incisal guidance there may be considerable freeway space, perhaps due to undereruption of the posterior teeth, or there may be a limited freeway space and normally erupted posterior teeth. If this procedure is to be accomplished at all it must be done within the freeway space. This does not make the procedure entirely safe. The freeway space does not always seem to be within physiologic limits of tissue tolerance.

The investigations of Boos[11] indicate that the opening at which a patient is able to exert the greatest amount of power is the rest vertical dimension. His studies indicate that the nearer the patient approaches this position the more occlusal power he is able to demonstrate. It is possible that greater occlusal power given these patients, by increasing the occlusal vertical opening, is used in nonfunctional occlusion, when the patient brings his teeth into contact hundreds of times a day without food between them. This added force in some instances would seem to be beyond the limits of tissue tolerance, even though the occlusal vertical dimension is well within the vertical dimension at rest position.

Increasing the occlusal vertical dimension also presents the problem of loss of occlusal contact of both the maxillary and mandibular incisors (Fig. 9). This must be taken care of with either retaining removable dentures or with fixed partial dentures, crowns, three-quarter crowns and so on to prevent extrusion or exfoliation of the incisors.

PARTIAL DENTURE DESIGN AND INCISAL GUIDANCE

Several problems in partial denture design are created by a steeply inclined incisal guidance. They are problems in support of the denture and in the distribution of the lateral forces of occlusion. These problems are much greater with the maxillary partial denture.

When it is necessary to support the maxillary partial denture on a cuspid, there is the problem of space. The labial surface of the mandibular cuspid occludes with the lingual surface of the maxillary cuspid, allowing insufficient space for the supporting rest of the maxillary cuspid clasp. This makes it extremely difficult to prepare the maxillary cuspid to receive a supporting rest. As a result many maxillary partial replacements are constructed with inadequate vertical support. This shortens the life of the supporting tooth.

A distal incisal notch on the supporting cuspid will give adequate vertical support in many instances, but will create an esthetic problem. A lingual inlay prepared to receive a rest will have to be made deeper than average so that the rest can be made strong enough to support the vertical component of muscular stress without interfering with the occlusion.[12, 13]

The problem of distribution of the lateral occlusal forces may be present in the maxillary denture when the incisal edges of the mandibular incisors are close to or in contact with the soft tissue of the palate. This in many instances precludes the use of a lingual plate or a continuous lingual clasp on the lingual surfaces of the maxillary incisors, for adequate stress distribution.

Adequate stress distribution may be obtained in these instances by splinting the abutment teeth with one or more proxi-

11. Boos, R. H. Intermaxillary relation established by biting power. J.A.D.A. 27:1192 Aug. 1940.

12. Collett, H. A. Principles of partial denture design. D. Digest 57:24 Jan. 1951.

mating teeth. This will give each unit the strength of a multirooted tooth.[13] Because this procedure is time consuming and expensive, it is all too often neglected, and the life of the partial replacement is shortened.

SUMMARY

The incisal guidance presents problems of occlusal stress distribution in the natural denture.

A steeply inclined incisal guidance may be concomitant with average vertical opening and freeway space or with less than average vertical opening and increase in freeway space.

The etiology of steeply inclined incisal guidance indicates that in many instances it could be prevented.

It is likely that the incisal guidance influences the functional movements of the mandible.

In some instances it seems desirable to modify the natural incisal guidance so that the occlusal stresses might be distributed more adequately.

A steeply inclined incisal guidance creates problems in support and occlusal stress distribution of partial dentures. Successful partial denture service requires special mouth preparation for these cases.

13. Collett, H. A. Biologic approach to clasp partial dentures. D. Digest 61:309 July 1955.

Personal Responsibility of the Individual • In the middle of the war against Hitler, if somebody had told me that I would one day be standing in the heart of Berlin before several hundred thousand of the citizens demonstrating their desire to be free, I would have said the person was crazy. Yet that very thing happened to me when I returned to the former German capital with the Freedom Bell, the symbol of the American campaign to pierce the Iron Curtain with the propaganda of truth. In open and dangerous defiance of the Russians and their East German puppets, thousands of West and East Berliners gathered in the middle of the city in a moving demonstration against tyranny. They had seen what democracy could mean and they wanted it.

I cite this incident to support my conviction that, given the proper circumstances, and some hope, man as an individual, wherever he may live, will demonstrate that he is inherently honest and decent. He wants little more than to live in friendship with his neighbor, in reasonable security, and to raise his children so they may find opportunity before them.

The troubled world in which we live should not dismay us. The world today is historically a better world than the world of the past. Though ruthless men still maintain power through force and would extend power through conquest, people elsewhere are becoming more tolerant and understanding than ever before. More peoples and more governments are willing to cooperate, to work together for peace and freedom, than in any time of history. We are more tolerant and understanding with each other, more willing to help our less fortunate neighbor here and abroad.

This is hopeful progress. It stems from the spread of freedom God gave us as a privilege. Like all precious possessions, freedom must be guarded carefully by good citizenship. To be a good citizen does not require the holding of public office, the achievement of political or financial success. But it does require voting from conviction, participating in community activities and to be honest with oneself and with others.

God has been good to us as a people. We can exercise the leadership in world affairs to obtain freedom and peace. We can lead abroad only as we continue to improve our life at home, to become truly a land in which there is equal opportunity for all. Personal responsibility of the individual can improve the life here and, perhaps, help others, when we show pride in our country by finding time to try to be good citizens, and by being grateful to God for his goodness.—*General Lucius D. Clay, The Creed of a Soldier.*

Interceptive orthodontics for the general practitioner

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The problem of malocclusion confronting the general practitioner of dentistry today is of such magnitude and variation that the present emphasis in dental education is shifting more and more toward the preventive aspects of dentistry.

The growth of the maxillae and mandible and the eruption of the teeth must be coordinated, one with the other, in a highly specialized time-space relationship for the development of a properly functioning dentition. It is during this developmental phase of the mixed dentition that a wayward tooth may lead to an incipient malocclusion. It is apparent that these incipient malocclusions must be corrected early and by simple means by the general practitioner, if a truly preventive program is to be implemented.

An understanding of the normal functions of growth and development as well as the mechanisms at work to produce a malocclusion are essential before treatment can be instituted. With the fundamental knowledge of development the general practitioner may correct many incipient malocclusions using the simple technical skills at hand.

THE MASTICATORY SKELETON

During the periods of most rapid change, that is, the growth years, of the human masticatory apparatus it is of more importance that the dentist concern himself with What should be done? and When should it be done? than How should it be done?

The basic form of infant skeletal pattern is predetermined by the genetic constitution of the individual. The size and shape of the maxillae and the mandible and their relationship to each other is "preset," long before birth. The tendency to a Class I, Class II and Class III molar, or jaw, relationship is inherited. The maxillary and mandibular portions of the face are small in an infant, and gradually increase in width, height and depth to a fully matured face. Growth mechanisms differ between the maxillae and mandible; the former being primarily sutural whereas the latter is primarily cartilagenous at the head of the condyloid process.[1] Any divergence in the rate of growth of the maxilla and mandible will affect the relation of the jaws and therefore the dental arches. Furthermore, the eruption of teeth must be coordinated with the growing bones else poor timing will result in malposition of the teeth.

Maxillary growth occurs through increase of bone at the frontomaxillary, zygomaticomaxillary, and pterygomaxillary sutures. These three sutures roughly parallel each other and face in a downward and forward direction. The result is

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1. Sicher, Harry. Oral anatomy. St. Louis, C. V. Mosby Co., 1949, p. 107-121.

that the growth of the maxillae is directed downward and forward. In addition to growth at these sutures, the alveolar processes increase in height. This results in an increase in the total height of the face. Growth of the alveolar processes is the result of and occurs with the eruption of teeth. This growth site is especially important during the period of the mixed dentition (6 to 12 years).

Mandibular growth occurs primarily as a result of cartilagenous proliferation at the condyle in an upward-backward direction with the result that the mandible lengthens downward and forward. The body of the mandible increases in size through apposition of bone on the posterior border of the ramus and subsequent resorption of the anterior border. The coronoid process makes a similar adjustment. It is through the resorption of the anterior border of the ramus that the body of the mandible lengthens and serves to "uncover" the unerupted molar teeth and also to "widen" the mandible posteriorly.

The alveolar process of the mandible serves to increase the vertical height of the body of the mandible. The alveolar processes of the maxillae and mandible become the mechanism of adjustment or the "coordinator" of the differences of growth between the maxillae and mandible as the mandibular body moves away from the base of the skull.[1]

The basic hereditary skeletal pattern is set; it begins to develop, eruption of teeth begins, and the stage is set for the developing occlusion. The maxillae, mandible, dental arches, and the individual teeth are now subjected to other influences or forces which serve to position the teeth.

ENVIRONMENTAL FACTORS CONTRIBUTING TO MALOCCLUSION

A number of forces are constantly acting on the teeth or on the arches as a whole. These may be classified briefly as (1) muscular forces, (2) occlusal forces and (3) eruptive forces.

Muscular Forces • The infant masticatory apparatus consists of dental pads of soft tissue void of teeth and surrounded by thick muscular and fatty tissue externally and a large tongue internally. The erupting teeth interpose themselves between the external and internal muscular pads. These teeth are molded into an arch form by these apposing muscular bands. The position of the teeth is therefore greatly influenced by these muscle bands. The muscular influence continues throughout life in such a manner that the teeth assume a position wherein they are in balance with their environment, that is, the muscular forces (Fig. 1 and 2).

Any deviation in muscular balance will be accompanied by migration of teeth; for example, the thumbsucking child adds a muscular force to those already present when the finger is placed in the mouth with the result that the lower anterior teeth may be lingually displaced while the upper anterior teeth are forced into a labial position. Usually an anterior open bite also results because the thumb prevents the complete eruption of the anterior teeth. The position of the displaced teeth reflects the type of muscular imbalance.

Occlusal Forces • The forces of occlusion herein defined refer to the stresses placed on the teeth during mastication. The teeth of the deciduous dentition stand erect so that the forces of occlusion are directed apically and are dissipated entirely through the periodontal structures (Fig. 3). Mesial drift in the deciduous dentition is almost nonexistent. This absence of mesial drift allows for physiologic spacing in the anterior region and the absence of space closure in the posterior region before the age of six years. With the eruption of the permanent molar teeth into the dental arch,

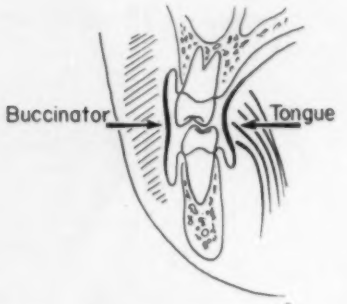

Fig. 1 • Balance of muscular forces in molar region between tongue and cheek muscles

however, the problem of the mesial drift begins. In contrast to the upright deciduous teeth, the permanent molar teeth erupt with a noticeable mesial inclination (Fig. 4). The mesial inclination of the molar teeth results in occlusal forces being directed mesially, instead of apically. This anterior component of occlusal forces is the mechanism whereby the contact areas are kept tight.

The position of teeth is greatly influenced by the anterior component of force when a tooth is extracted because the extraction breaks the continuity of the arch. Mesial drift occurs and at the same time contact points slip; the forces of occlusion are thus allowed to displace a tooth labially or lingually.

Eruptive Forces • The direction and amount of force exerted on the dental arches during eruption depends on which tooth is erupting and whether it is maxillary or mandibular. The mandibular first permanent molar exerts a strong eruptive force mesially and lingually using the tooth anterior to it (second deciduous molar) as a buttress against which to right itself (Fig. 5). In contrast, the maxillary first molar erupts in a distal and buccal direction, away from the arch, until it meets muscular resistance. It then begins to swing mesially until it contacts the last tooth present in the arch, the second deciduous molar (Fig. 5). The second and third molars erupt in a similar pattern but at this time the eruptive forces are acting upon a completely permanent arch.

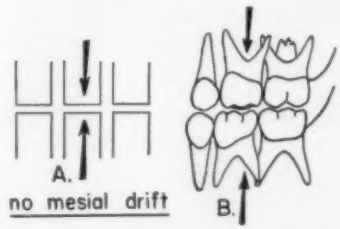

Fig. 3 • Upright position of deciduous teeth provides for opposition in vertical direction (A), thereby forces of occlusion (B) show no mesial drift

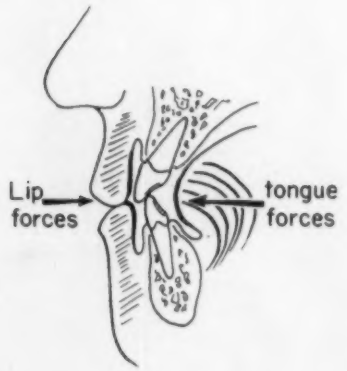

Fig. 2 • Relation of anterior teeth to surrounding muscular bands. Tongue and labial musculature exert constant and opposing force. Any disturbance in delicate muscular balance results in migration of teeth

The anterior teeth erupt in a similar pattern to those of the molar teeth, that is, the lower anterior teeth erupt toward the midline whereas the upper anterior teeth erupt away from the midline and then swing mesially. The physiologic spac-

ing of the upper permanent incisors is usually corrected through the eruption of the lateral incisors and through the strong eruptive force of the cuspid tooth between the first bicuspid and lateral incisor.

The physiologic crowding of the lower anterior teeth may be corrected when the deciduous cuspid teeth are lost and the permanent cuspids erupt with accompanying growth in alveolar bone and more room for incisor positioning.

Incipient malocclusion may then arise from poor coordination during the growth periods of the maxillae and mandible, or locally through any of the forces

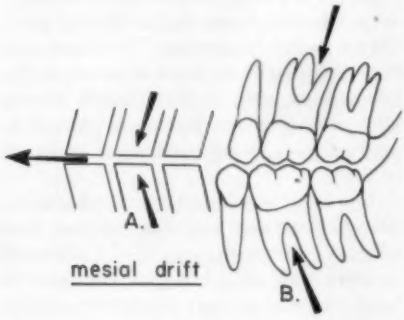

Fig. 4 • Mesial inclination of permanent teeth (B) causes forces of occlusion to be partially dissipated in a mesial drift resultant force

acting on the arch as a whole or any combination of the forces.

LOSS OF ARCH LENGTH

The deciduous molars are important factors in the development of permanent arch length serving as natural space maintainers and the "guides of the erupting permanent teeth."

The simplest and best space maintainer is a good proximal filling. These should be placed as early as possible. One of the most common causes for the loss of space in the dental arch is proximal caries.

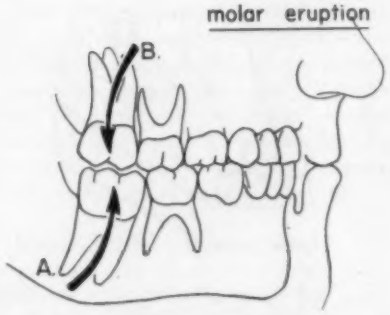

Fig. 5 • Lower permanent molars (A) exhibit mesiolingual eruption path using second deciduous molar as buttress in contrast to upper molar eruption (B) in distobuccal direction rotating against deciduous molar for guidance

Carious lesions on proximal surfaces produce a loss in tooth structure with the result that the adjacent tooth drifts into the carious defect (Fig. 6). The moving tooth may also rotate. For this reason, early operative procedures with proper restoration of the proximal anatomy and contact area is the best and most adequate space maintainer.

If a general rule were to be formulated in the matter of maintaining space, it would be this: Space maintainers must be

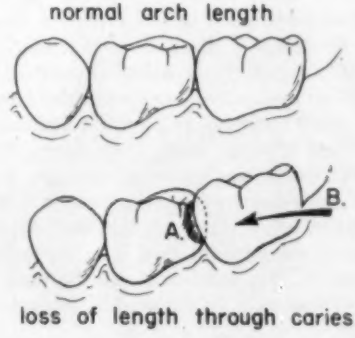

Fig. 6 • Unrestored carious lesion (A) reduces arch length. Adjacent tooth is thus allowed to migrate or erupt into lesion (B)

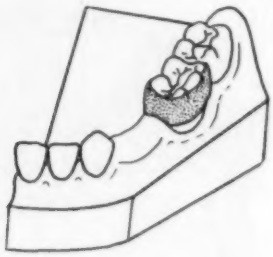

Fig. 7 • Preformed band or crown, cast band, or pinch band adapted to tooth posterior to edentulous space. Gingival margin adaptation must be made with care to avoid overhanging band material

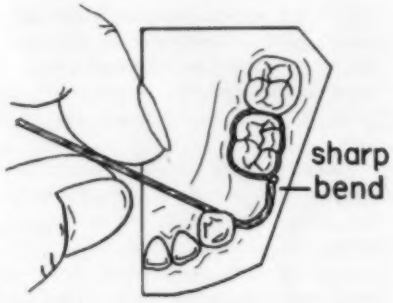

Fig. 8 • With band in place on sectional model, 0.030 gold or steel wire is formed as a loop serving as connector between abutments

used whenever there is early loss of any deciduous molar and any tendency for the adjacent or opposing teeth to drift.[2]

Band-Loop Space Maintainer • The band-loop space maintainer employs the use of a band or crown for anchorage to which is soldered a connector.[3] The connector may be a loop of wire, a bar, a tube or an arch. The band used may be made either directly in the mouth or indirectly on a model. A preformed (factory-made) band or shell crown may also be used. The basic construction of the space maintainer itself is the same in all instances.

The tooth which is posterior to the edentulous space is fitted with a band as in Figure 7. Burnishing the band to perfect gingival adaptation is essential.

A preformed band or crown, cast band, or pinch band can be used for anchorage in this type of space maintainer. The pinch band has many advantages over the preformed band or crown, not the least of which is the much better adaptation at the gingival level. The preformed band or cast band also may be used if chairtime must be replaced by laboratory time.

With the band or crown in place on the tooth an alginate or compound impression is taken of the entire quadrant (with a sectional tray). The band or crown is then removed from the tooth and positioned in the impression. The inner surface of the band which is adjacent to the edentulous space is then lightly coated with wax and the model is poured in soldering or casting investment as shown in Figure 7.

The band is relieved at the edentulous side to facilitate soldering of the loop (Fig. 8). The loop consists of 0.030 gold or steel wire depending on the type of band material used. It is formed by bending the wire into a horseshoe shape wide enough to allow eruption of the succedaneous tooth through the loop if necessary. The loop is contoured to rest against the abutment tooth just below the contact point and then extending on each side of the edentulous space back to the band (Fig. 8). The wire should rest on the soft tissue to prevent jiggling and damaging the abutment by action of the tongue on the loop.

Where the loop meets the band, a sharp bend is made in the wire so that it rests flush against the band (Fig. 8). Care

2. Brauer, J. C. Report of 113 early or premature extractions of primary molars and the incidence of closure of space. J. Den. Children 8:222 4th Quart. 1941.

3. Salzmann, J. A. Principles of orthodontics, ed. 2. Philadelphia, J. B. Lippincott Co., 1950, p. 679.

must be taken to avoid impingement on the marginal gingiva at this point.

The loop is soldered to the band at both sites where the wire meets the band at the buccal and lingual prominences (Fig. 9). The maintainer is then removed from the models, polished and seated in the mouth with zinc oxyphosphate cement.

Removable Acrylic Space Maintainer • Acrylic space maintainers usually are employed when the loss of teeth is bilateral. They have the disadvantages inherent in all removable acrylic appliances, that is, they are rather fragile and require time in the laboratory for processing. Being removable, they are subject to frequent breakage and distortion by the child. A great virtue of this type, however, is not only its versatility but also its ability to restore occlusal function. The appliance is akin to the removable partial prosthesis in the adult with the difference that clasps are used sparingly if at all.[4,5]

This type of appliance is the one of choice where the structure of the abutment teeth will not permit construction of bands and where the abutments are infracluded. They are especially useful where, in addition to space maintenance in the posterior regions, an anterior tooth is missing. An incisor pontic may be added easily for esthetic reasons.

Palatal Acrylic Space Maintainer • In the upper arch, mechanical retention in the form of clasps is usually not needed since simple mucostatics is generally sufficient to retain the appliance in the mouth. The edentulous regions may be filled with blocks of acrylic or with acrylic teeth, preformed or carved (Fig. 10).

Upper Incisor Replacement • The premature loss of a deciduous incisor seldom requires replacement for space maintenance. The lost permanent incisor, however, always should be replaced lest drifting of the adjacent incisors cause loss of space. The most satisfactory replacement (both for space maintenance and esthetics) is an acrylic incisor pontic attached to an acrylic palate (Fig. 11).

Lower Acrylic Space Maintainer • The lower acrylic space maintainer is useful where several teeth of the posterior segments are missing bilaterally. The acrylic bar connecting the saddles may be reinforced with an embedded piece of metal. Clasps are usually not required but simple rests may be used for stability (Fig. 12).

The relatively new self-curing acrylic

4. Brauer, J. C., and others. Dentistry for children, ed. 3. Philadelphia, Blakiston Co., 1952, p. 386-400.

5. Offer-Spitz, Age. Prophylactic appliances in early childhood. Am. J. Orthodont. & Oral Surg. 30:378 July 1944.

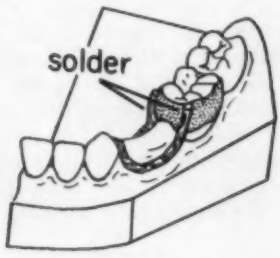

Fig. 9 • Loop must be sufficiently wide for succedaneous tooth eruption, must rest on tissue and must contact anterior abutment just below contact point to insure against displacement

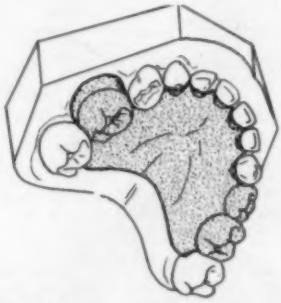

Fig. 10 • Upper acrylic space maintainer replaces any number of teeth using palatal vault and remaining teeth to resist movement of permanent molars

Fig. 11 • Acrylic palate utilizing pontic tooth for temporary replacement of lost permanent incisor. Appliance maintains space and restores esthetics

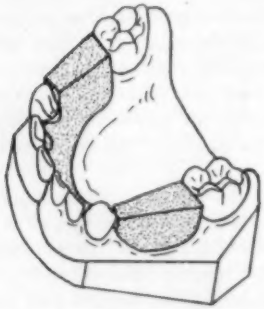

Fig. 12 • Lower acrylic space maintainer replaces any number of lost deciduous molars. All anterior teeth as well as mandibular alveolar process act to prevent anterior displacement of permanent molars

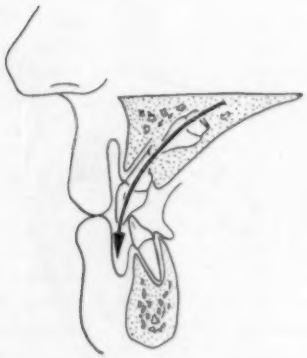

Fig. 13 • Normal eruption path of permanent incisor. Note concomitant resorption of deciduous tooth root

materials are generally used for these appliances since they are comparatively temporary in nature. The technic for use of the self-curing acrylics is presented later when the palatal appliances are discussed.

ANTERIOR CROSS-BITE

Etiology • The normal path of eruption of the permanent incisors is a curvilinear one wherein the erupting incisor is high in the maxilla and slightly lingual to the root apex of the deciduous tooth. As the permanent incisor erupts, concomitant resorption of the deciduous root occurs (Fig. 13).

The most common cause for the lingual displacement of a permanent maxillary incisor is the prolonged retention of a deciduous predecessor. Prolonged retention of a deciduous incisor may be due to ankylosis between cementum and alveolar bone or the presence of an unresorbed portion of the deciduous tooth root left in the path of the erupting permanent tooth (Fig. 14).

Habitual pressure on the teeth or the jaws may also cause the lingual displacement of the maxillary incisor. A crowded arch caused by the presence of teeth which are disproportionately large in relation to the maxillary base also may result in such lingual displacement, especially of the lateral incisors.

Effects of Lingual Displacement • If the incisor cross-bite (scissored incisors) is not corrected early, inflammation and recession of the gingiva of the opposing tooth usually follow. These result from the fact that the lower incisor is subjected to a continuous jiggling action by the lingually displaced upper incisor. Such trauma causes the labial gingivae and bone to recede rapidly.

The space available for the maxillary lateral incisors frequently becomes encroached on when the central incisors are displaced lingually. Frequently, too, the

lateral incisors become displaced lingually.

The condition should be corrected early lest the malocclusion becomes permanent. The best time to achieve the correction is during the eruption of the permanent incisor teeth before they come into full occlusion (at six to nine years of age).

Correction of Lingually Locked Upper Incisors • There are two methods used to correct lingually locked upper incisors.

Tongue Depressor • A narrow tongue blade has been used for many years as a lever to correct an incisor cross-bite. This method is especially useful when the condition is incipient and the displacement is mild (Fig. 15).

The tongue blade may be used in two ways: (1) as a lever which uses the lower incisors as a fulcrum and which exerts strong hard pressure on the inlocked upper incisor and (2) as a bite plane, by having the patient bite on the blade after it is positioned in the mouth (Fig. 16).

The tongue depressor method will usually be unsuccessful if more than the incisal third of the tooth is locked. The distance from incisal edge of the upper tooth to incisal edge of the lower becomes too great for the tongue depressor to produce correction.

Acrylic Guide Plane • The acrylic guide plane (Fig. 17) is perhaps the most versatile and least traumatic of the corrective devices in this category.[6,7] It can be used to correct the linguoversion of one tooth or the entire anterior segment. Since the acrylic guide plane is cemented in place and includes more than one tooth, the jiggling action and trauma by the antagonists are eliminated (Fig. 17). The movement is rapid but physiologic since the force exerted on the teeth is the result of normal muscular action.

The device is easy to construct and simple to adjust. It is constructed by the indirect method which saves considerable chairtime. The appliance is strong and well tolerated by the tissues.

The incisor guide plane can be cast in metal; however, the hard metal may cause trauma to the opposing teeth, so acrylic resin is preferred.

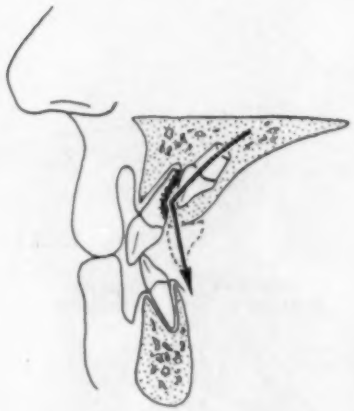

Fig. 14 • Abnormal path of eruption and lingual displacement of permanent incisor due to ankylosis of deciduous incisor root

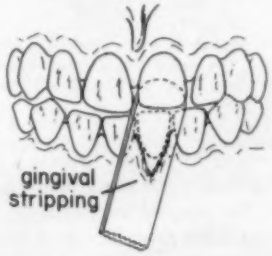

Fig. 15 • Tongue depressor used as lever for correction of incisor cross-bite. Note gingival trauma with subsequent stripping of tissue, initially produced by cross-bite

6. Rabinowitch, B. Z. Correction of displaced incisors by the general practitioners. J.A.D.A. 35:876 Dec. 15, 1947.

7. Massler, Maury, and Suher, Theodore. Lingually locked maxillary incisor; rapid technic for the construction of a plastic bite-plane. J. Den. Children 16:26 1st Quart. 1949.

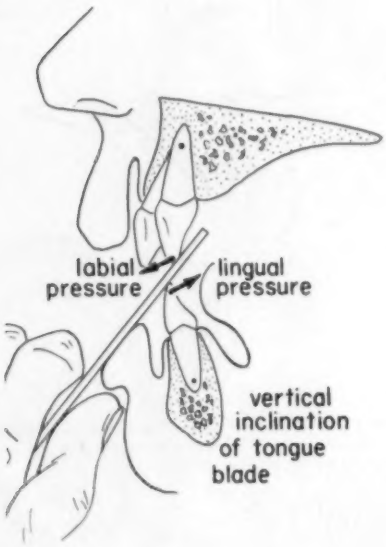

Fig. 16 • Manner in which patient inserts tongue depressor. The more acute the angulation of depressor the more rapid and physiologic will be the movement

The acrylic guide plane may cause the bite to be opened temporarily during treatment. Care must be taken, therefore, that the guide plane is not left on the teeth for an excessive length of time.

The acrylic lower anterior guide plane is constructed in the following manner: A full mouth impression is taken in modeling compound or alginate. The model is poured in stone. The upper and lower working models are mounted on a suitable articulator. It must be certain that the correct bite relationship has been established.

The amount of overbite exhibited by the displaced teeth is determined by examination of the mounted models from both labial and lingual aspects. The available space into which the tooth or teeth can fit is measured. There must be enough space available into which the displaced tooth can be moved. If not, a space opening device should be used. An attempt must be made to visualize the size and pitch of the incline plane necessary to move the tooth or teeth into correct occlusion.

The lower anterior teeth are painted with a suitable separating medium and allowed to dry. The labial surfaces of the lower teeth are moistened with the liquid monomer. The powdered acrylic resin is painted or sprayed onto the moistened surfaces until a thickness of about $\frac{3}{32}$ inch is achieved. Occasionally additional liquid monomer will have to be added. The powdered acrylic resin must be kept moist continuously. The entire labial surface of the lower teeth must be covered.

The model is inverted, and the same process is repeated on the lingual surfaces. In this instance, however, only one half of the lingual surfaces of the teeth is covered.

When the labial and lingual acrylic resin has become "doughy" (two to three minutes), acrylic resin is added to the incisal portions. A bulk of material is slowly built up. This bulk should approximate closely the inclined planes as desired in the finished appliance. These should extend well to the lingual surface so as to engage the incisal edges of those teeth to be moved.

When the self-curing acrylic resins are used, the dentist must allow for trimming; thus the appliance should be made oversized and trimmed to the desired shape. When all acrylic material has been added, the acrylic resin is covered with oil (mineral or silicone) and allowed to set. Setting time is 15 minutes.

The acrylic resin may now be removed, trimmed and polished. It should be remembered that occlusion should only be on the teeth to be moved. The inclined planes must be as acute (not horizontal) as possible. The more acute the angle the more rapid and least traumatic will be the movement.

The appliance is cemented in place with zinc oxyphosphate cement.

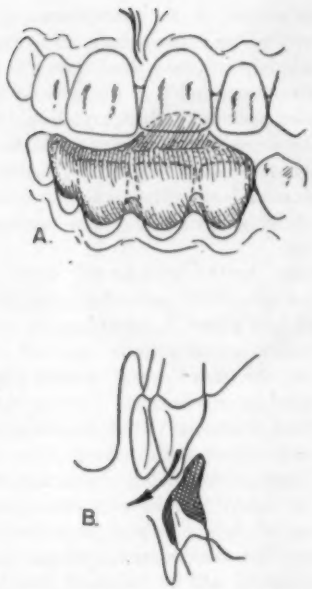

Fig. 17 • Acrylic bite plane utilizes many lower anterior teeth for anchorage (A). This anchorage is advantageous in moving a larger, stronger tooth. Inclined plane extends to lingual surface of displaced incisor. Inclined plane should be as acute in angulation as possible (B)

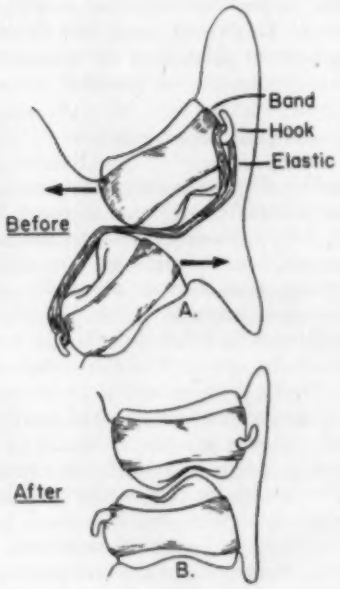

Fig. 18 • Crisscross elastics for posterior crossbite correction. Note buccal displacement of upper molar and lingual displacement of lower molar (A). Elastic provides constant tension between teeth for correction (B)

Discussion • The patient should be instructed to bite against the guide plane, gradually increasing the force exerted until a distinct sensation of tooth movement is felt. This movement should be in a labial direction. Blanching of the overlying labial gingiva should be watched for at this time. If periapical pain exists, the inclination of the guide plane should be increased. Some children instinctively avoid pressure on the teeth so that tooth movement is very slow. Forcible exercises should be practiced at least three times a day.

The appliance is left in place until the lingually locked incisor is brought well over the incline plane. It is often desirable to move the tooth or teeth well past their final labial position since some relapse will occur after the appliance is removed. Bringing the incisors edge to edge is not enough. Relapse will occur unless the lingually locked incisor is brought well over the labial surface of the lower incisors so that the lower incisors act as retainers.

Caution • The appliance must be removed within two weeks after placement or eruption of the posterior teeth would occur and permanently open the bite. Movement of the lingually locked teeth is ordinarily accomplished within this time limitation.

The parent should be instructed to observe the child's habits. Under no circumstance should the child protrude the mandible and engage the labial surface

of the upper teeth with the acrylic appliance. This could cause the "further displacement palatally of the teeth which you are trying to move labially."

POSTERIOR CROSS-BITE

Cross-bites in the molar region are common. They are attributed to many factors, such as leaning habits, tongue positions and ectopic eruption. The tongue, by being positioned in the palate, can create such excessive width that all the maxillary teeth will lie fully buccal to the mandibular teeth. If held within the mandibular arch, it will cause an overexpansion of that arch in which the mandibular molars are placed buccal to the maxillary molars. Leaning habits exemplified by resting the face on the knuckle of one fist while the person is reading or otherwise being occupied have been reported to restrict the development of maxillary arch width, thus producing a cross-bite.

When the path of eruption of the maxillary and mandibular first permanent molars is considered, it is easy to understand that if the rate of vertical eruption and buccal or lingual movement are not synchronized, a cross-bite can occur. The maxillary molar bud is directed distally and buccally and in erupting must turn mesially and lingually. The mandibular molar bud is directed mesially and lingually and on erupting must turn distally and buccally. Any lack of synchronization of the entire process of eruption may cause a cross-bite.

The cross-bite in the buccal region is serious in that if allowed to continue it will interfere with normal developmental processes and create a more serious problem.[8] Buccal cross-bite of deciduous molars is not as serious as when it occurs in the permanent molars, because the deciduous teeth will be shed and the interval of time between their loss and the cuspal interlocking of the permanent bicuspids permits some recovery.

Cross-bites of the permanent molars will not correct themselves, and must be attended to as soon as discovered. It is not recommended that the general practitioner undertake the correction of extensive cross-bite conditions, but he can render a great service by correcting the simpler and more common conditions which involve only the first permanent molars.

Molar teeth, because of their bulk, are not adaptable to correction by the inclined bite plane. A bite plane of proper inclination would require excessive opening of the mouth and would not be tolerated by the patient.

When it can be determined that only one of the two teeth involved in the cross-bite is out of normal position, that tooth can be moved into correct alignment by the use of an acrylic plate and the finger spring. The construction and use of the finger spring will be discussed along with the Hawley retainer.

When both molar teeth are at fault, as is usually the case, the use of a rubber band stretched between those teeth is adequate for full correction[9] (Fig. 18). The steps in using the rubber band are as follows:

1. Bands are fitted to the crowns of the molar teeth involved.

2. Hooks pointing gingivally and made of gold or steel, depending on the band material, are attached to the buccal surface of the buccal tooth and lingual surface of the lingual tooth.

3. A rubber band, small enough to maintain tension when the jaws are closed or at rest, is stretched between the two hooks (Fig. 18).

The rubber bands are worn 24 hours per day and replaced each 24 hours. The patient is given a supply to last between visits and instructed to keep a few extras

8. Salzmann, J. A. Principles of orthodontics, ed. 2. Philadelphia, J. B. Lippincott Co., 1950, p. 540.

9. Strang, R. H. W. Text-book of orthodontia, ed. 3. Philadelphia, Lea and Febiger, 1950, p. 591.

on his person for replacements if breakage occurs. The patient should be seen at intervals of three weeks, and the full correction may take as long as two or three months. The cross-bite must be overcorrected, that is, carried to a cusp-to-cusp relationship in the opposite direction. It is then allowed to settle into its final position; the bands then are removed (Fig. 18).

PALATAL CRIB FOR CORRECTION OF ORAL HABITS

Oral Habits • Oral habits constitute a major portion of the various tics and mannerisms to which the child is subject. The most common oral habits are: (1) thumbsucking and finger-sucking, (2) nailbiting, (3) lip-biting, (4) lip and tongue-sucking and (5) tongue-thrusting. Many habits are merely tension-relieving mechanisms.

Some of these habits, such as thumbsucking, have been shown to be damaging to the developing, mixed or permanent dentitions, whereas others, such as nailbiting, are not so damaging.[10,11]

Correction of Thumbsucking • The effects of thumbsucking may be disastrous to the occlusion of the child over six years of age. Therefore, interception must often be practiced when a better method of removing the cause for thumbsucking is impossible or impractical.[10] Correction of thumbsucking is almost always indicated during the mixed dentitional period (6 to 12 years). If damage is apparent in the deciduous dentition, individual judgment must decide whether the damage is transitory and may be ignored or might be permanent and should therefore be prevented.[10] Use of the appliance in children under three years of age is very rarely indicated.

Treatment of the habit must be accompanied by a sympathetic approach to the child's problem. This is much more effective than nagging or scolding, which serves only to fix the habit with an underlying sense of guilt. Specific treatment is, of course, an individual problem. To motivate properly the child to want help in correcting the habit requires ingenuity, wisdom, sympathy and understanding of the fundamental factors involved in the causation of thumbsucking. Thumbsucking cannot be corrected by any one given formula. Some children respond quickly to simple means of correction, whereas with others the task proves discouraging. The problem must be attacked by bringing it out of the realm of the subconscious into the conscious. Most important, full cooperation of the child must be won. A noncooperative, resentful child can easily overcome the barriers of the most bitter substances and painful thumbguards. A thorough understanding of the problem and appreciation of the psychologic implications involved in thumbsucking are therefore essential to the successful management of the thumbsucker and treatment of thumbsucking.

Purpose and Action of Palatal Crib • The purpose of the palatal crib is twofold: first, to remind the child and make him aware that he is sucking his thumb and second, to prevent the formation of the vacuum essential to the act of sucking.

A constant but nonpunitive reminder will soon bring the habit from the level of the subconscious to his conscious attention. The palatal crib acts by preventing the formation of a vacuum by the tongue when the finger is sucked (Fig. 19). The success of the appliance lies in the fact that suction becomes impossible and only air is drawn into the mouth. The act, therefore, becomes futile and is soon discontinued.

10. Massler, Maury, and Wood, A. W. S. Thumbsucking. J. Den. Children 16:1 1st Quart. 1949.

11. Pearson, G. H. J. Psychology of finger-sucking, tongue-sucking, and other oral "habits." Am. J. Orthodont. 34:589 July 1948.

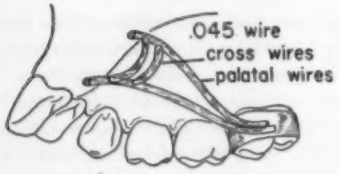

Fig. 19 • Palatal crib for thumbsucking rests passively on tissue with several arched cross wires connecting two tissue-borne palatal wires. Crib prevents thumb-palate contact, is nonpunitive, and reduces habit satisfaction through preventing suction

Construction of Palatal Crib • Two pieces of 0.045 inch gold wire, each 2 inches in length; 2½ inches of 0.045 inch gold wire; gold solder and soldering equipment; band material (gold) for posterior teeth; band forming pliers; impression tray; compound and investment are the materials needed.

1. Bands are placed on the upper second deciduous molars or first permanent molars, if the latter are fully erupted into the oral cavity.

2. The bands are placed back on the respective teeth, and an impression is taken of the whole arch in compound or alginate material.

3. The impression is removed. The bands usually remain embedded in a compound impression, but may slip out of an alginate impression. If so, they should be replaced accurately into the impression.

4. A small layer of pink wax is melted onto the inner aspect of only the palatal half of the band. This will facilitate the soldering of the wire to the band, since the space between the investment and the band insulates and holds the heat instead of dissipating it through the investment.

5. Soldering investment is poured into the impression.

6. The impression material is removed, and the wax on the inner aspect of the band is eliminated carefully with boiling water. Care must be taken that all the traces of wax are removed, since wax will interfere with the soldering operation.

7. One piece of 0.045 wire is adapted from one band to the other following the palate anteriorly as in Figure 19. The adaptation is begun from the center of the wire at the midline of the palate and proceeds laterally.

8. The ends of the wire are bent to make good contact with the band surface for at least 2 mm. up the palatal surface of the band.

9. The other piece of 0.045 wire is bent in a similar way, but this wire is adapted to the palate about 4 to 5 mm. posterior to the first one in the midline, as in Figure 19. Both wires should be tissue-borne. The ends of both wires are soldered to the band.

10. Four pieces approximately 6 to 8 mm. long are cut from the piece of 0.045 inch wire. Each piece is bent into a slight curve. Each small piece is fit across the two palatal wires with the curvature away from the palate by about 3/16 inch.

11. Each piece of wire is soldered to the palatal wires, with each piece spaced as shown in Figure 19.

12. The crib is removed from the investment cast. The tags are cut from the bands and the bands are filed smooth. The crib is pickled in acid; the appliance is cleaned and polished. The appliance may be heat-treated, if necessary.

Precautions • The palatal crib should not be active. It should rest passively on the palate and against the bands to avoid any movement of the banded teeth. The palate should bear the entire brunt of the force exerted by the digit which is being sucked. If the child sucks his thumb vigorously and the palatal wires become embedded too deeply into the soft tissue, a plastic base may be added to the palatal surface of the crib.

Tongue-Thrusting • The origin of the tongue-thrusting habit is often obscure.

In some instances, it may result from a previously existing anterior open bite. In others, the habit may itself cause a typical anterior open bite with protrusion of the upper incisors. Some authors[12] relate a painful tonsillitis or pharyngitis as the origin of a tongue-thrusting habit, especially if the abnormal tongue-thrust occurs only during swallowing.

Various types of tongue-thrusting may be encountered. The three most common types of tongue-thrusting occur in (1) lisping, (2) abnormal swallowing and (3) resting with tongue protruded.

Habitual thrusting of the tongue between the anterior teeth may occur in certain speech defects characterized by lisping. More frequently, the thrusting of the tongue into the space between the anterior teeth may occur during swallowing. Since swallowing may take place as much as 150 times per hour and often with great vigor, it becomes obvious that early interception of such a habit is necessary to prevent the development of a severe anterior open bite with protrusion of the incisor teeth.[12]

Passive thrusting of the tongue between the anterior teeth may occur when the mandible is brought into normal rest position. Children often sit for hours looking at movies or comics with the tongue partially protruded from the mouth. Such a habit may or may not interfere with the eruption and correct occlusion of the anterior teeth. The effects vary from person to person and from age to age. The habit is most injurious to the newly erupting incisors of the child between the ages of six and eight years.

The palatal crib described for the correction of thumbsucking is easily modified to correct an abnormal tongue-thrust. The crib portion of the appliance is merely turned at a 90 degree angle in relation to the palate, as in Figure 20. This vertical crib acts as a guard to catch and hold the tip of the tongue and to prevent its protrusion between the anterior teeth.

If the thrusting is performed with vigor, it may be necessary to use two molars on each side for anchorage. This will tend to prevent movement of the banded molars by the tongue.

The appliance should be permitted to remain as long as the anterior open bite is present. If the normal labial muscular action is insufficient to mold the upper anterior teeth to correct position and thus to close the space, the patient should be referred to the orthodontist.

HAWLEY RETAINER

The Hawley retainer is a device which has many applications. It is used by the orthodontist to maintain the position of teeth which have been moved.[13] It is also used for the following purposes: (1) as a base for finger springs to make minor tooth movements, (2) to increase the vertical height of the natural denture and (3) to retract labially flared and spaced anterior teeth. The last purpose, the use of the Hawley retainer to retract teeth,

12. Brauer, J. C., and others. Dentistry for children, ed. 3. Philadelphia, Blakiston Co., 1952, p. 150-152.

13. Strang, R. H. W. Text-book of orthodontia, ed. 3. Philadelphia, Lea & Febiger, 1950, p. 701, 702, 782-787.

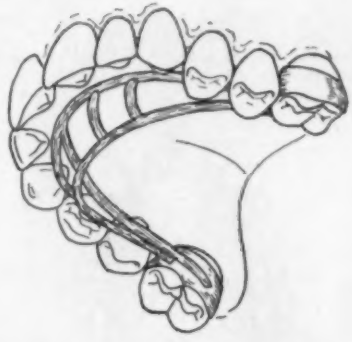

Fig. 20 • Turning palatal crib 90 degrees provides basket to catch thrusting tongue thereby removing forces from anterior teeth

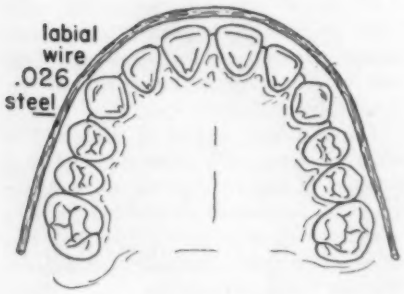

Fig. 21 • Labial wire for Hawley retainer is contoured to rest on labial and buccal surfaces of teeth from molar to molar

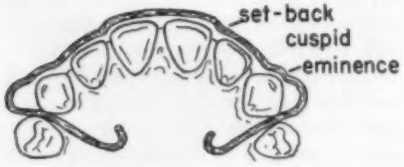

Fig. 22 • Bend is placed in labial wire distal to central incisors as set-back since lateral incisors are slightly lingual to central incisors

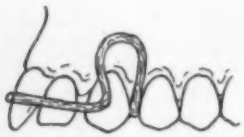

Fig. 23 • Labial wire is contoured to a gentle loop gingivally, then passes through cuspid-bicuspid embrasure where it becomes embedded in acrylic resin

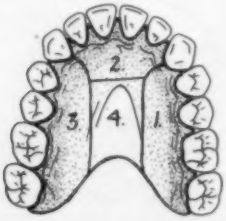

Fig. 24 • Palatal portion of Hawley retainer is divided into sections to facilitate forming of acrylic resin to an even thickness

is restricted to Class I malocclusions of the teeth. Procumbent incisors are common with other classes of malocclusions and are manifestations of more serious disturbances in the posterior portions of the denture. In these instances no amount of anterior retraction can be completely successful or permanent without compensating adjustments of the posterior teeth.

The Hawley retainer consists of two and possibly three parts. These are (1) the labial wire, (2) the palatal part and (3) the bite plane when necessary. The labial wire lies horizontally across the anterior teeth and in the cuspid regions is bent to form an open loop which ends by passing through the interproximal area between the cuspid and first bicuspid teeth to be buried in the acrylic resin of the palatal part. The suggested material for the labial wire is 0.026 inch round stainless steel wire.

Construction • In making the labial wire, the following procedure is used:

1. A length of 0.026 stainless steel wire is cut. This will extend around the labial and buccal surface of the natural denture from the distal surface of one permanent molar to the other (Fig. 21).
2. An arch which closely resembles the curvature of the anterior part of the natural denture is formed.
3. Between the lateral and central incisors, slight set-back bends are made so that the wire will lie flat on the lateral as well as on the central incisors (Fig. 22).
4. A cuspid eminence bend should begin distal to the lateral incisors. This bend should extend to the middle of the labial surface of the cuspid tooth.
5. At that point the wire should be bent abruptly in a gingival direction to form an open loop about 3/8 inch long which ends at the cuspid-first bicuspid interproximal area (Fig. 23).
6. The wire should be bent to pass through this interproximal area onto and

in close proximity with the palatal tissues. It should curve gently distally and palatally to end in a sharp bend for security (Fig. 23).

In constructing the palatal part of the retainer, the acrylic resin used is self-curing. The procedure for construction follows:

1. With the use of a camel's hair brush, the lingual surface of the model including the teeth is painted with a uniform coating of separating film.
2. The labial wire is placed in position and fixed with sticky wax against the labial surface of the anterior teeth.
3. The surface of the model is divided, mentally, into four areas as shown in Figure 24.
4. Starting with area 1 or 3, the model is held so that the area is nearly horizontal. A layer of self-curing acrylic powder to the depth of 4 to 5 mm. is poured onto the area selected (Fig. 25).
5. With a dropper, the liquid monomer is applied to the dry powder until it becomes completely saturated (Fig. 26).
6. The ends of the labial wire are lifted with an instrument and moved slightly to permit the acrylic resin to flow beneath them.
7. The surface of the acrylic resin can be flattened and smoothed by vibration. This is done by tapping the model with the tip of the finger.
8. If any part of the model underneath the acrylic resin shows through distinctly, the coating is too thin, and more powder and liquid should be added to these spots.
9. Steps 4 through 8 are repeated for the other areas of the model. Care must be taken to maintain the same thickness.

The flat bite plane is used to create either a temporary or permanent increase in the vertical dimension of the jaws. When used as a temporary measure it facilitates other orthodontic procedures, such as the correction of severe crossbites, or the unlocking of a distally

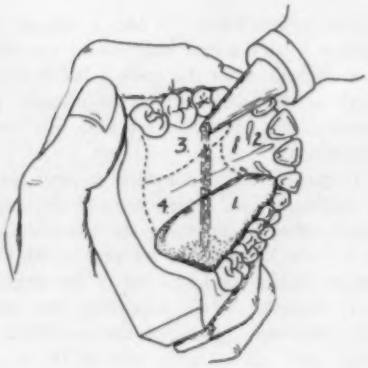

Fig. 25 • Layer of self-curing polymer is added to a thickness of 4 to 5 mm. Plastic spray bottle is used as convenient method of applying acrylic powder

Fig. 26 • Liquid acrylic monomer is added to powder in droplet form until powder is saturated. At the same time, model is tapped with finger to allow for escape of trapped air

Fig. 27 • Palate is modified by adding sufficient material on lingual surfaces of teeth to form raised flat bite plane. Lower anterior teeth occlude with flat plane thereby opening bite posteriorly

thrusted mandible.[14,15] As a means to induce a permanent increase in the vertical dimension of the jaws it holds some teeth apart, while others are allowed to continue eruption and establish the new dimension.

Deep overbites, common in any class of malocclusion, retard normal development either by crushing the mandibular arch form lingually or by causing an excessive flaring and spacing of the maxillary anterior teeth. Opening the bite vertically will (1) unlock the mandibular teeth and allow their normal forward development and (2) permit the retrusion of the maxillary anterior teeth, since their labiolingual thickness is much less at the incisal edges than at the gingival.

The bite plane is constructed at the same time as the palatal portion of the retainer by returning to area 2. With the use of the same method of application, a flat section is built up which extends posteriorly far enough to engage the lower anterior teeth in their most retruded position (Fig. 27).

The plane is built up to the level of the incisal edges of the anterior teeth and when finished is reduced in height to make the required opening.

After the acrylic resin has been allowed to set for 20 minutes, the retainer and bite plane is removed from the model, trimmed with a vulcanite bur and fitted. When ready, it is polished as usual and placed.

Use of Hawley Retainer • The Hawley retainer is used to retract anterior teeth in which a deep overbite is not present. The Hawley retainer without a bite plane is placed and after allowing two or three weeks for the patient to become accustomed to it, a few millimeters of the acrylic resin lingual to the incisor teeth is removed and the loops of the labial wire are compressed a bit forcing the labial wire to press upon those teeth.[15,16]

The process of removing acrylic resin and compressing the loops is repeated at three week intervals until the teeth are fully retracted.

The acrylic resin lingual to the teeth must be removed on a slant which is parallel to the lingual surfaces of those teeth.

The Hawley retainer also is used to retract anterior teeth in which a deep overbite is present (Fig. 28). In this instance the incisal tips of the lower anterior teeth engage the gingival tissue lingual to the cingulum on the maxillary teeth. These teeth cannot be retracted as long as the lower teeth are in the way. The vertical dimension must be increased first, before the retraction of teeth.

The bite plane is added and adjusted

Fig. 28 • Protrusive teeth with deep overbite. Lower anterior teeth occlude on cingulum of upper anterior teeth or on gingivae. Posterior bite is closed

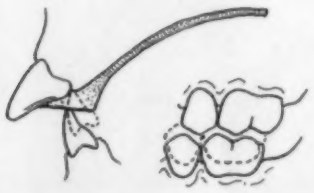

Fig. 29 • Application of acrylic bite plane opens posterior bite allowing molars and bicuspids to erupt, thereby freeing anterior teeth

14. Calloway, G. S. Use of bite plates. Am. J. Orthodont. & Oral Surg. 26:120 Feb. 1940.

15. Salzmann, J. A. Principles of orthodontics, ed. 2. Philadelphia, J. B. Lippincott Co., 1950, p. 807-813.

16. Hemley, Samuel. Bite plates, their application and action. Am. J. Orthodont. & Oral Surg. 24:721 Aug. 1938.

to increase the vertical dimension in the posterior region by 2 mm. (Fig. 29). After the posterior teeth have erupted into contact the platform is increased by adding acrylic resin to the bite plane which will again increase the vertical dimension in the posterior region by that amount (Fig. 30). This process is repeated until the desired height is reached, after which the teeth are retracted by stages to the final position (Fig. 31-33). The Hawley device then becomes a retainer with a bite plane and is left in place until a new balance between the component parts of the masticatory apparatus is established.[16]

The Hawley retainer is also used as a base for finger springs (Fig. 34). In addidition to the movements of teeth already mentioned, there are occasions when it is desirable to make minor adjustments in the mesiodistal or buccolingual position of teeth. These movements, however, must be restricted to those instances in which there is room to move the tooth, and in which its tipping while moving is permissible.

The force to move the teeth is obtained by means of the finger spring, which is a flexible cantilever spring formed to exert force in a manner similar to the human finger.[17] The springs are made of stainless steel wire in varying sizes from 0.012 to 0.026 inch. Each spring must be flexible and strong enough to support itself against dislodgment during mastication. Thus a short spring must be thinner to have flexibility, and the long spring thicker to have support strength.

Finger springs may be added to the Hawley retainer either in its making or after it is finished. However, since it is desired that the spring be movable over the surface of the acrylic resin, it is best to add them after the palatal part of the retainer has been completely finished.

After the design of the spring and size of wire has been determined, the end of the spring to be attached to the base is curved into a circle with the pliers. Close

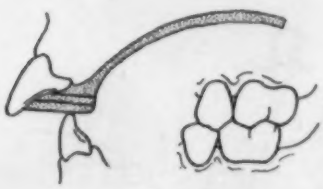

Fig. 30 • Acrylic resin is added step by step until desired opening is achieved

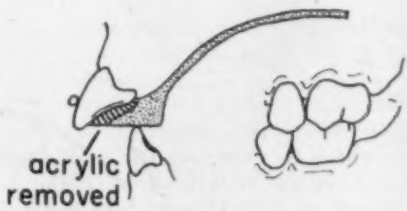

Fig. 31 • Acrylic material which is lingual to upper anterior teeth is relieved to allow arch wire to retract anterior teeth

to the circled end, a step bend is placed in the wire which permits the main length of the spring to lie on the surface of the acrylic resin while the looped end is buried.

With a bur the acrylic resin is dug out to accommodate the loop and the wire up to the step bend. The free end of the spring is attached to the teeth with the sticky wax and the ground out part refilled with acrylic resin.

The fastened spring can be adjusted with the pliers to exert a gentle force against the tooth to be moved.

The labial wire of the Hawley retainer serves as a guide during the mesiodistal movement of anterior teeth, and prevents their rotation.

Care must be exercised that all acrylic resin between the proximal surfaces of the teeth being moved is removed.

17. McCoy, J. D. Applied orthodontics, ed. 6. Philadelphia, Lea & Febiger, 1946, p. 323-327.

Fig. 32 • Wire loop is closed so that when appliance is inserted into mouth, arch wire provides spring tension on anterior teeth for retraction

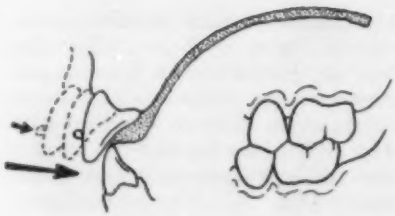

Fig. 33 • Corrected occlusion after first increasing vertical dimension and then retracting anterior teeth in successive stages of removal of acrylic resin and spring tension adjustment

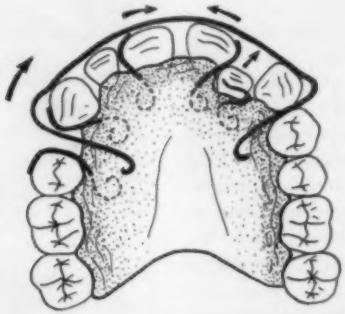

Fig. 34 • Addition of finger springs to Hawley retainer provides minor movements of teeth limited only by operator's ingenuity. Spring tension must be within limits of periodontal membrane to respond

SUMMARY

The orthodontist and pedodontist are often asked to treat child patients for problems in occlusion which are quite minor at the time but if left uncorrected would continue to fully developed malocclusions. Such treatments are not involved in their management and are rather easily corrected using simple technical skills. The basis for judgment on the part of the practitioner rests in his thorough knowledge of the growth processes. If the general practitioner has this knowledge and understands the mechanisms which cause malocclusions, the correction of minor malocclusions is neither costly nor time consuming.

Prevention begins with space maintenance when a tooth is lost prematurely. Prevention involves interference with a detrimental force such as thumbsucking when that force is acting to mold incorrectly a developing dentition. Last, prevention is still corrective when one or two malaligned teeth may be correctly positioned early to insure the proper development of occlusion.

Phonetics in denture construction

Howard E. Kessler, D.D.S., Cleveland

The phonetic aspect of denture construction is of utmost importance; yet it is not always given the detailed attention that is usually given to appearance and fit. Speech has always been the most important medium for the communication of ideas and, down through the centuries, has been one of the chief forces behind human progress. The mouth is the instrument for speech, and the dentist is the specialist of the mouth. That dentistry, and all its specialties, plays a leading role both in maintaining normal speech and in helping to correct certain speech defects has been established previously.[1]

In recent years it has been asserted that the human voice has become a slave to mechanization. Many television and motion picture actors and actresses have become so used to working with the microphone that they are afraid to take part in a stage presentation because they will then be forced to use and project their "naked" voices without mechanical help from the microphone.

The modern sound engineer can work wonders with the human voice. While sitting at his control board, he can create a strong, colorful, powerful voice out of a thin, drab, weak voice. Whereas the microphone can change the quality of the voice and make it possible for weak or poor voices to "get by," by the same token it intensifies the types of speech defects that can be associated with the wearing of dentures. Thus the present-day widespread use of the microphone makes the role of the dentist even more important.

The majority of denture wearers do not have any trouble with their speaking procedures. Of this enormous number of satisfied denture wearers, a certain percentage have dentures which are phonetically correct for them and the remaining percentage of the total have been able to compensate with their tongues or lips for the phonetic shortcomings of their dentures. Of this second group of patients, the majority compensate almost automatically because of the amazingly high degree of adaptive behavior of the human tongue.

USE OF TAPE RECORDER

A tape recorder is an important part of the prosthodontist's equipment. A high frequency model with a mileage-type index counter is preferred, so that when the voices of many denture patients are recorded on one large tape, the dentist is able to note their index numbers and know exactly where a patient's recording begins and ends. It is easy then to look on the patient's file card for the number of the patient's before-extraction record-

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1. Kessler, Howard E. Relationship of dentistry to speech. J.A.D.A. 48:44 Jan. 1954.

ing (if one was secured at that time), his wax try-in recording, his practice recordings and final recording. Since the index counter has taken guesswork out of the tape selection, the dentist can now play back any of these recordings immediately without the patient's having to hear other patients' voices whose recordings are adjacent on the tape. A compact single knob control model is simple for the dentist to use. A great number of patients can be recorded on a single 1,200 foot roll of tape. The tape recorder is more accurate and more versatile than either the wire or the disk recorder, in the writer's opinion.

Silverman[2] states:

> It is now possible by the use of the speaking method to measure a patient's vertical dimension before the loss of the remaining natural teeth, and to record this in terms of millimeters, and to reproduce this measurement in full dentures at a later date.

This is a good procedure, but, in addition to this, it is helpful to tape record the patient's voice at this time. This procedure is valuable because it gives the patient a little needed ear training and some understanding of where his tongue touches, while he still has his natural oral sensation.

It is a known physiologic and psychologic fact that individuals do not hear their own voices as others hear them. When one has his voice played back to him, he usually says, "That doesn't sound like me. That isn't my voice, is it?" The only patients who do not react like this are those from the television and theatrical world who are used to hearing their voices played back to them. They too, however, need this procedure when they come to have dentures made. As far as the ordinary patient is concerned, to hear a recording of his voice shows him how he himself really sounds to other people, and usually will give him some knowledge on the subject, so that he will better understand the dentist when the subject of speech production is discussed after (and during) the denture construction.

THE DENTURE AND SPEECH

It used to be thought that the use of artificial rugae helped the patient to feel "natural" in speaking when he gets his new dentures. After experimentation, the author has changed his mind on this point. Some artificial rugae on acrylic resin upper dentures are a hindrance to tongue placement and also make the region too thick. The naturally contoured rugae now being used in the metal dentures, however, seem to be all right, probably because they are thinner and more accurate.

If the upper denture is too thick in this region just lingual to the anterior teeth, phonetic difficulties can be caused. In English, a T or a D (they are the same except that the D is voiced) is produced with the tip of the tongue touching the region just posterior to the upper anterior teeth. Now, if the tongue should meet a foreign material without surface sensation about a fourth inch sooner (or a half inch, as was seen with one phonetically incorrect denture) than was the case before the denture was inserted, this is bound to create some difficulty.

Correct centric relation and vertical dimension are, of course, important for the patient's speech. The vertical dimension is particularly important because it tends to control or regulate the amount of space in which the tongue has to work. If compensatory tongue movements are necessary for normal speech with a given denture, the compensation is made easier if the freeway space is adequate or more than adequate. If an error is made in the vertical dimension of a set

2. Silverman, Meyer M. Speaking method in measuring vertical dimension. J. Pros. Den. 3:193 March 1953.

of dentures, it is better, for good speech production, to err on the side of too much freeway space.

Hearing loss seems to have a lot to do with the degree of adaptive ability to learn to speak well with dentures. Persons who have impaired hearing are sometimes never able to get rid of their newly acquired speech defect by compensating for their phonetically incorrect dentures. Age seems to have a lot to do with this problem also. Elderly patients often have a great deal of trouble compensating for their first set of dentures because their speaking patterns have been established for such a great length of time.

A situation which sometimes arises is a speech defect from a denture in which the upper anterior teeth are set in a crooked, staggered fashion to make them look more natural. The teeth usually look nice and natural in these instances, but they will sometimes make the wearer lisp by altering the air-rushing space used for the production of sibilants. Many people with this problem can be helped by a speech therapist who will teach the patient to compensate with tongue or lips for dimensional increase or change in aperture. Many patients, however, do not want to receive speech therapy, so the next best thing is for the dentist to remove the anterior teeth and set them in a straight, conventional manner. It is peculiar that some patients who lisp with their dentures did not have any speech defect before, even though their natural dentition was made up of teeth in the same crooked positions.

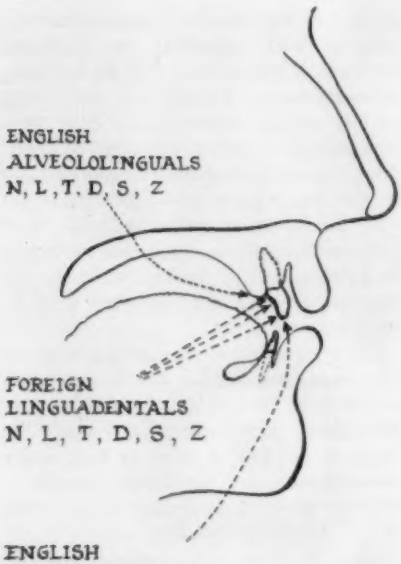
Certain brands of acrylic resin are phonetically superior for dentures in some instances because the cingula can be blended better into the base material. Some porcelain anterior teeth have prominent cingula and, thereby, cause possible phonetic difficulties. The author is now engaged in a research project involving putting anterior teeth of many different brands of material, one after another, in the mouths of many different patients and recording the patients' voices each time on the tape. In this way, information can be obtained concerning exactly which materials are best phonetically for various types of patients. Each tape recording must be played back to the investigator many times and in different reversed orders because it is often difficult to be completely objective in judging normal and defective speaking voices. Some, unfortunately, must be judged subjectively.

The construction of a partial denture can sometimes take as much care, phonetically, as the making of a full denture. Sometimes, a television actress will be upset at the loss of three or four upper teeth because her livelihood depends so heavily on normal, flexible speech and she is afraid of possible tongue interference from an upper partial denture. Of course, some of these patients are best helped by the use of fixed bridgework. There are some instances, however, where removable bridgework for some reason or other is the treatment of choice. In some of these instances it is advisable to use the powdered plate method.

An alginate upper impression is taken and a stone model is poured. A thin, dark vulcanite palate piece is made. If the dark vulcanite is not found easily, it is possible to simplify the procedure by using a burnished heavy foil palate piece. The dark vulcanite will show up better by contrast, but either can be used.

This palate piece is covered with a talc and put in the patient's mouth. The wearer is instructed to produce all the consonant sounds and later to read a passage containing all the sounds in English. All tongue placements are evidenced by the rubbing off of powder. The palate piece is put back on the stone upper model and the design of the upper partial denture can be modified to circumvent all definite tongue placement areas.

For such a reading test the following passage has been found adequate because



Mechanics of speech production

it is supposed to contain all the sounds of the English language:

ARTHUR THE RAT

Once there was a young rat named Arthur who never could make up his mind. Whenever the other rats asked him if he would like to go out with them, he wouldn't say yes or no either. He would always shirk making a choice.

One rainy day there was a great noise in the loft where the rats lived. The beams were all rotten so that the barn was rather unsafe. At last one of the rafters gave way and fell to the ground.

"This won't do," said the Captain Rat. "I'll send out scouts to search for a new home."

At last the scouts came back and said they had found a house where there was room and board for them all. The rats all scampered to make ready to leave the old barn; but not Arthur.

"You are coming, of course," the Captain Rat asked Arthur.

"I'm not sure," said Arthur undaunted, "the roof may not come down yet." So Arthur sat and watched the others hurry away. That night there was a great storm. Down came roof, beams, the whole barn. In the foggy morning some men came to see what damage had been done. When one of them moved a board, he found a young rat, quite dead, half in and half out of his hole. Thus the shirker got his due.

This passage may be used for full denture recording also.

Just about every dentist has used the word "Mississippi," which is good. The following has often been used for a check on S and Z sounds:

I rough out my thoughts in talk as an artist models in clay. Spoken language is so plastic—you can pat and coax, and spread and shave, and rub out, and fill up, and stick on so easily, when you work that soft material, that there is nothing like it for modeling. Out of it come the shapes which you turn into marble or bronze in your immortal books if you happen to write such.

For a selection to drill T, D and N, the author uses Lincoln's "Fourscore and seven . . ." as far as the sentence "It is altogether fitting and proper. . . ."

Denture patients from the theater usually will have favorite passages of their own with which they are familiar and which they want to read.

For instances in which the patient's speech was defective before the denture was constructed, the dentist should make the denture as phonetically correct as possible; but such patients also need the professional assistance of a speech therapist.

DENTURES AND LANGUAGE DIFFERENCES

Patients who speak a language other than English have less trouble phonetically with their dentures, and there is a definite mechanical reason for this (see illustration).

In most languages N, L, T, D, S and Z are linguadentals (S and Z are sibilants). N is a nasal but as for actual tongue placement it is an alveololingual

or linguadental, depending on the language spoken, because it is articulated by contact of the tongue on the teeth or alveolar ridge. Patients who speak a language other than English usually let the tongue lie on the floor of the mouth with the tip behind the lower anterior teeth. They sound their dental consonants by lifting the mandible so that the blade of the tongue touches the upper teeth. The movement is much like biting.

In the English language, however, the true linguadentals are the Th's—sounds which do not occur at all in many languages. In English the N, L, T, D, S and Z sounds are more properly referred to as alveololinguals because they are articulated on the alveolar ridge near the point of the lingual surface of the upper anterior teeth. If a denture is made for a foreign language-speaking patient or an English-speaking patient who uses his foreign language-speaking pattern, the patient will not have too much difficulty with his biting type of tongue sound actions because he is using the incisal edges of the upper anterior teeth mainly for his contact. It can be understood easily that, no matter how the upper denture is constructed, these incisal edge positions cannot be too far from the natural dentition position.

In contrast to this, the English-speaking patient has more use for the area just lingual to the upper anterior teeth for tongue touching. For obvious reasons, it is more difficult for the dentist to get this area contoured to the most natural degree for a patient. Also, the factor of material without surface sensation enters into the picture. The contour of the upper denture is less important phonetically for foreign language-speaking patients.

DISCUSSION

Since the city of Cleveland has a very large foreign-born population, the author has had a grand opportunity to make these observations. The statement can be made that in denture work care with phonetics is most important with patients who speak good English.

In some isolated instances the dentist is fortunate enough to have a speech therapist's cooperation while making a denture. In the majority of instances, however, the dentist is working alone. Consequently, the largest share of responsibility for the denture wearer's speaking voice rests on the dentist.

The patient bears part of the responsibility for his own speech. Effort on the part of the patient in learning to use the dentures for speech is just as important and difficult as it is for mastication. If a patient requires two weeks to learn to masticate properly with his new dentures, he should allow a similar period for relearning correct speaking procedures.

The dentist can fulfill his responsibility for the speech of his denture patients by making all dentures as correct phonetically as possible and by taking the time to give each patient as much education in phonetics as is needed for utilizing his new dentures in normal, intelligible speech.

304 Park Building

Science and the Citizen • There is no greater necessity in the world of today than a closer understanding by politicians and citizens of the motives and methods of science, and by the scientist of the inevitability of politics and the responsibilities of citizenship. *Sir Robert Watson-Watt.*

Topical application of stannous fluoride

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During 1955, Indiana University received more than 2,500 requests from dentists throughout the United States for stannous fluoride to be used in their private practices for topical application. As a result of these requests, and after many personal contacts with dentists who are desirous of using stannous fluoride, it was considered important to make available the technic, as well as the method of preparation of the stannous fluoride solution, for use by the general practitioner. More basically, however, it is necessary for those who wish to use this fluoride to understand clearly how to prepare and apply the stannous fluoride solution, as has been determined from evidence obtained from human clinical studies, in order to obtain its maximum benefits, since its properties are so different from those of sodium fluoride.

The use of stannous fluoride as an anticariogenic agent is based on clinical observations of children which indicated a superiority of the stannous salt over sodium fluoride when topically applied.[1-3] Similarly, stannous fluoride has been found to be superior to sodium fluoride for reducing powdered enamel solubility[4] and rat[5] and hamster[6] dental caries. Also, Slack[7] has reported a reduction in the incidence of human dental caries in the mandibular first molar after the topical application of stannous fluoride.

TECHNIC FOR PREPARATION OF STANNOUS FLUORIDE SOLUTIONS

The clinical effectiveness of stannous fluoride depends on the prevention of oxidation of the stannous tin to the stannic state. This observation is based on the fact that stannic fluoride is not as effective in reducing dental caries in the rat as stannous fluoride,[8] and that freshly prepared solutions of stannous fluoride are more effective in reducing dental caries in the rat than aged solutions.[9]

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1. Howell, C. L., and others. Effect of topically applied stannous fluoride on dental caries experience in children. J.A.D.A. 50:14 Jan. 1955.

2. Gish, C. W., and others. A new approach to the topical application of fluorides for the reduction of dental caries in children. Unpublished.

3. McLaren, H. R., and Brown, H. K. A study of the use of a topically applied stannous fluoride solution in prevention of dental caries. Canad. J. Pub. Health 46:387 Oct. 1955.

4. Muhler, J. C.; Boyd, T. M., and Van Huysen, Grant. Effect of fluorides and other compounds on solubility of enamel, dentin and tricalcium phosphate in dilute acids. J.D. Res. 29:182 April 1950.

5. Muhler, J. C., and Day, H. G. Effect of stannous fluoride, stannous chloride and sodium fluoride on incidence of dental lesions in rats fed a caries-producing diet. J.A.D.A. 41:528 Nov. 1950.

6. Radike, A. W., and Muhler, J. C. Incidence of dental caries in hamsters receiving two different water-soluble fluorides at low concentrations. J.D. Res. 32:807 Dec. 1953.

7. Slack, G. L. Effect of topical application of stannous fluoride solution in prevention of dental caries. (Abst.) J.D.Res. 34:785 Oct. 1955.

8. Muhler, J. C. Effect of stannic fluoride on incidence of dental caries in the rat. Unpublished.

9. Muhler, J. C.; Nebergall, W. H., and Day, H. G. Preparations of stannous fluoride compared with sodium fluoride for prevention of dental caries in the rat. J.A.D.A. 46:290 March 1953.

In order to assure that the solutions of stannous fluoride have a high percentage of the tin in the stannous form, the solutions must be prepared fresh and be used immediately. This is most conveniently done by having a pharmacist weigh 0.40 Gm. of solid stannous fluoride into a Lilly no. 0 gelatin capsule. It is important to keep the filled capsules containing the solid stannous fluoride in a container which can be sealed tightly after the removal of individual capsules. Similarly, the solid sample of stannous fluoride should be sealed tightly to prevent air and moisture from entering the container, since this will aid in preventing oxidation of the surface crystal of stannous fluoride.

Immediately before use, the contents of a single capsule are added to 10.0 ml. of distilled water and shaken briefly. After the contents have completely dissolved, the solution is applied immediately to the teeth. The 10 ml. of solution should be sufficient to treat the whole mouth of a single patient. If any remains, it should be discarded and not used again. Many dentists find it convenient to have a 25 ml. graduated cylinder for measuring the distilled water and a 25 ml. polyethylene bottle in which to mix the solution. The solution is easily mixed by stirring it with the cotton-free end of the wooden cotton applicator which will subsequently be used to apply the solution to the teeth. No flavoring or coloring agent should be added to the stannous fluoride solution.

TECHNIC FOR APPLICATION TO THE TEETH

At the time of the initial visit, a thorough prophylaxis is performed. Special care must be taken to clean and polish thoroughly with pumice each available tooth surface, since clinical evidence suggests that the effectiveness of the topical treatment is decreased if a prophylaxis does not precede the initial treatment.[10] Toothbrushing, as a substitute for the prophylaxis, is not considered satisfactory.

Immediately after the prophylaxis, the first treatment is applied. One quadrant of the mouth is isolated with cotton rolls. Both the lingual and the labial (or buccal) surfaces should be isolated with cotton rolls since it is necessary to keep the teeth absolutely dry during the treatment period. (Some dentists find it more convenient to use the Garmer clamp to hold the cotton rolls in place, thus making it possible to treat one half of the maxillary and mandibular arches at one time.)

After the teeth are isolated, they are dried thoroughly with air, and the stannous fluoride solution is applied with a cotton applicator. The teeth are kept moist with the stannous fluoride solution throughout a four minute period by repeatedly moistening the teeth with the fluoride solution. After the treatment of one quadrant, the remaining teeth are treated in exactly the same manner, and the patient is dismissed.

The topical application is repeated for three additional treatments in the same manner, except that only the first is preceded by prophylaxis. The four series of applications should be completed within a 10 to 14 day period. The four series of treatments can be started when the child is three years old. After the age of six, however, it might be well to repeat the treatments every two years.

10. Jordan, W. A., and others. Effects of various numbers of topical applications of sodium fluoride. J.A.D.A. 33:1385 Nov. 1946.

Reduction of radiation output of the standard dental x-ray machine utilizing copper for external filtration

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There is a growing awareness on the part of the practicing radiologist, the geneticist and the pathologist that the biological burden accompanying diagnostic roentgenography may be much greater than is desirable.[1] It has been apparent for some time that surface tissue erythema could be reduced with aluminum filtration wherein the aluminum filter absorbs the softer roentgen rays. These very soft, low energy roentgen rays are disseminated only within the soft tissues of the face and do not contribute to the exposure of the film.[2]

Although the possibility of using such external filtration has been common knowledge for many years, most dentists have failed to include such filters in their x-ray apparatus. The failure of the profession to discipline itself has led public health authorities in various states to sponsor legislation which makes it legally incumbent on the dentist to use some minimum filtration.[3, 4]

Even these minimum standards produce an effective roentgen ray field that is high for the typical dental roentgen ray operation (10 milliamperes, 65 kilovolt peak, using medium speed film at an average exposure of two seconds). A further maximum reduction of radiation should be the goal of every dentist, both from the standpoint of his personal health and of his feeling of responsibility and concern for the safety of his patients.

Etter[5] pointed out in a recent article that significant progress could be made in this direction if fast roentgenographic film, aluminum filters, and a high speed electronic timer were used. His work was carried out using a 60 through 100 kilovolt peak roentgen ray source.

INVESTIGATION

The present paper reports on a method of accomplishing the same end with the standard 10 milliampere, 65 kilovolt peak dental x-ray machine using copper filtration, fast film and the mechanical timer now employed in most dental offices. The dentist needs to make only minor changes in his technic of exposure and development; his equipment is aug-

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1. The biological effects of atomic radiation. Washington, D. C. U. S. National Academy of Sciences, National Research Council, 1956.

2. Files, G. W. Medical radiographic technic. Springfield, Ill., Charles C Thomas, 1954, p. 108.

3. Texas State Department of Health. Regulations on radiation exposure. Austin, Texas, Texas State Department of Health, Sept. 1, 1956.

4. New York State Department of Health. The sanitary code, chapter XVI. Albany, N. Y., New York State Department of Health.

5. Etter, L. E. Radiation dose reduction by higher voltage dental roentgenography. J.A.D.A. 53:305 Sept. 1956.

mented by the addition of the proper filter. The resulting roentgenograms exhibit the "long gray scale" type of contrast. Such roentgenograms have an improved diagnostic value and are comparable to those produced with the new 90 kilovolt peak machine. At the same time, the effective roentgen ray exposure to the patient is reduced by 90 to 97 per cent.

High speed film, when used for radiation dosimetry, has a range with an upper limit of about 0.6 r. This means that 0.6 r exposure blackens the film to a point at which a minimal amount of light passes through it. To reach a range well below the "blackening" level, the radiation reaching the film can be reduced either by shortening the exposure or by attenuating the beam with filters. The resultant exposure of the film then falls within a range of the film density limits and a diagnostic roentgenogram can be taken with roentgen ray exposure smaller than 0.6 r.

It is advantageous to attenuate selectively the low energy quanta in the roentgen ray beam by using proper filtering material. The selective filtration acts to harden the beam, and allows utilization of only the higher energies of the beam to expose the film. It is this beam of high average energy quanta which produces a roentgenogram with a "long gray scale" contrast range and effectively increases the image detail. In comparison, the high contrast black and white roentgenogram is produced mainly by the low energy roentgen rays. The absorption factor for these low energy quanta differs noticeably in soft tissues and in calcified structures.

In the laboratory, this concept may be demonstrated by using a monoergic roentgen ray source; that is, one producing roentgen rays of only one energy. For the monoergic 25 kilovolt roentgen rays, the mass absorption coefficient for carbon is 0.315 sq. cm. per gram; for calcium it is 6.6 sq. cm. per gram. At this energy level, a crisp, short contrast scale, black and white image is produced. The monoergic 47 kilovolt roentgen rays, with mass coefficients of absorption for carbon and calcium 0.185 sq. cm. per gram and 1.10 sq. cm. per gram, respectively, create an image with a longer scale of gray. Although the teeth will not stand out in harsh contrast to the soft tissues at the 47 kilovolt level, incipient changes in the calcium-containing structures become more apparent. At the same time, the common tendency to "burn out" the image is eliminated so that resorptive changes occurring interdentally and periapically are more readily recognizable. In practice, the monoergic 25 kilovolt roentgen rays may be compared to the 65 kilovolt peak, unfiltered roentgen ray source. The monoergic 47 kilovolt roentgen ray is comparable to the copper filtered 65 kilovolt peak machine or to the aluminum filtered 90 kilovolt peak machine.

MATERIALS

The following materials were used in the study:

1. Standard 65 kilovolt peak, 10 milliampere dental x-ray machine (with 0.5 mm. inherent aluminum equivalent filtration).

2. Ninety kilovolt peak, 15 milliampere dental x-ray machine (with 1.5 mm. inherent aluminum equivalent filtration).

3. Condenser -r meter (Victoreen) with 25 r chamber.

4. Ultra-speed dental x-ray film (Kodak).

5. Aluminum step wedge penetrometer (1 mm. steps).

6. Filters (for external filtration).
   a. Aluminum (0.5 mm. and 1.0 mm.)
   b. Copper (0.125, 0.250, 0.375, 0.5, 0.750 and 1.0 mm.)

Table • Level of effective radiation in air at 8 inch target-film distance, using 10 milliampere and 65 kilovolt peak

Filter		Dose (r per second)
Copper	Aluminum	
0	0	3.6
0.125	0	.59
0.250	0	.25
0.375	0	.12
0.500	0	.083
0.750	0	.035
1.000	0	.015
0	0.5	2.4
0	1.0	1.7
0	1.5	1.3
0.125	1.5	.38
0.25	1.5	.18
0.375	1.5	.11

METHOD

A series of readings were taken with the Victoreen meter; the filters listed in the accompanying table were used. Exposures up to 20 seconds were used so as to accumulate sufficient ionization within the chamber and to allow accurate determinations of the dose rate. Data in the table indicate that when the dentist uses this machine in an unfiltered condition, at a two second exposure, the patient receives in excess of 7.0 r per exposure.

This excessive dose exists for two reasons: first, a large fraction of the unfiltered beam is made up of low energy radiation which is disseminated into the soft tissues of the face and does not contribute to the exposure of the film; and second, the medium speed film most commonly used in dental roentgenography requires relatively greater increase in exposure time. The use of copper filtration selectively attenuates the undesirable soft radiation in the beam and simultaneously reduces the total effective radiation at the film. This in turn permits the use of ultra-speed film without changing the time of exposure.

From the table it can be noted that the first 0.125 mm. of copper attenuates the beam by about 83 per cent. This makes it possible to calculate that the unfiltered beam is absorbed by copper to the same degree as a monoergic 25 kilovolt roentgen ray. After the beam has passed through 0.250 mm. copper, it behaves like a monoergic 34 kilovolt roentgen ray. Finally, when a filter of 0.375 mm. of copper is used, the beam assumes the characteristics of a 47 kilovolt roentgen ray. Increasing the copper filtration beyond this thickness does not further harden the beam appreciably. It must be remembered that in the process of absorbing roentgen rays, copper, in turn, emits its characteristic K radiation, a 9 kilovolt ray. The elimination of these soft rays can be accomplished by adding 0.5 mm. aluminum after the copper. The addition of the aluminum, however, does not change the characteristic of the copper filtered rays.

When the 65 kilovolt peak roentgen ray beam, filtered with 0.375 mm. of copper and 0.5 mm. of aluminum, was used clinically, the resulting roentgenograms exhibited the "long gray scale" contrast diagnostically desirable. The effective tissue dose for the two second exposure required was 0.24 r (as compared with the unfiltered dose of 7.2 r). To confirm the quality of the filtered roentgen ray beam, roentgenograms of an aluminum penetrometer were made on ultra-speed film. These roentgenograms were comparable to images similarly recorded with a 90 kilovolt peak source.

SUMMARY AND CONCLUSIONS

Since it was recognized that there is a need for a reorientation in the dentist's present thinking toward radiation protection, a practical research problem was initiated.

A standard dental x-ray machine, operating at 10 milliampere, 65 kilovolt peak, at a two second exposure with ultra-speed film produced 0.24 r in air when externally filtered with 0.375 mm. copper and 0.5 mm. aluminum. This was

an approximate reduction to 1/30th of the unfiltered dose in air (7.2 r). These values are for a specific machine and may require minor alterations with respect to brand or individual machine variations.

Diagnostically superior roentgenograms, of a quality comparable to that produced by a 15 milliampere, 90 kilovolt peak dental x-ray machine, were achieved when copper-aluminum filtration was used.

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Impressions for indirect inlays

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The recent improvement in the indirect method for making gold inlays is based on the proper use of either one of two elastic impression materials—reversible hydrocolloid and the newly introduced mercaptan rubber.

The use of the reversible hydrocolloid material for indirect inlays has been advocated by Sears,[1,2] Thompson,[3] Buchmann,[4] Phillips,[5] Bignell,[6] Kimball,[7] Mann,[8] Lindley,[9] Inskipp,[10] Knapp,[11] Kendrick[12] and others. The newly introduced rubber impression material is as good as, and in some respects superior to, the reversible hydrocolloid. This new material comes in paste form, in two tubes, one of base material and one of accelerator. Equal lengths of these two are spatulated together to form a material which converts to a tough, resilient rubber in a few minutes.

Both the reversible hydrocolloid and the rubber are elastic; no other dental impression materials are elastic except the alginates (irreversible hydrocolloids) which, however, do not produce the clinical accuracy produced by reversible hydrocolloids.

An impression material for indirect inlays must be elastic because it must record accurately undercut regions which are in the external tooth surface adjacent to the prepared cavity outline (Fig. 1).

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1. Sears, A. W. Hydrocolloid impression technique for inlays and fixed bridges. D. Digest 43:230 May 1937.

2. Sears, Andy, and Wooster, H. L. Sears hydrocolloid technique. J. Florida D. Soc. 21:5 March 1950.

3. Thompson, M. J. Standardized indirect technic for reversible hydrocolloid. J.A.D.A. 46:1 Jan. 1953.

4. Buchmann, W. A. Use of hydrocolloids in inlay and bridge prosthesis. Fort. Rev. Chicago D. Soc. 16:7 Nov 15, 1948.

5. Phillips, R. W., and Ito, B. Y. Factors influencing the accuracy of reversible hydrocolloid impressions. J.A.D.A. 43:1 July 1951.

6. Bignell, K. A. Use of hydrocolloid impression material in inlay, crown and bridgework. New York J Den. 24:206 May 1954.

7. Kimball, H. D. Hydrocolloid in restorative operative dentistry—technique and principles. D. Digest 55:64 Feb. 1949.

8. Mann, A. W. Critical appraisal of the hydro-colloid technique: its advantages and disadvantages. J. Pros Den. 1:727 Nov. 1951.

9. Lindley, R. C. Hydrocolloid technique for restorative dentistry. J. Canad. D. A. 19:552 Oct. 1953.

10. Inskipp, E. F. Modified technic for use of hydrocolloids in taking impressions for inlays. J.A.D.A. 38:38 Jan. 1949.

11. Knapp, K. W. Hydrocolloid impressions—after ten years. New York D. J. 14:249 May 1948.

12. Kendrick, Z. V., Jr. Sears hydrocolloid impression technique in restorative dentistry. J.A.D.A. 33:445 April 1946.

Fig. 1 • Model at left demonstrates insufficient buccal extension. Model at right shows proximobuccal wall and margin properly extended buccally. Note appreciable reduction of undercut region on external tooth surface near buccoproximal margin

All external tooth surface gingival to the surveyed line on the models illustrated is undercut with regard to the line of draw of the preparation (or the line of withdrawal of the impression). A certain amount of this undercut external tooth surface adjacent to the cavity margin should be displayed on the die to indicate the location of the cavity margin and to signify the desirable contours of the restoration, particularly in regions near the margin.

The use of plastic compound as an impression material for indirect inlays should be discarded. Because it is not elastic, distortions are inherent.

CONTAINER REQUIREMENTS

The success of the indirect method over the past 19 years is attributable not only to the introduction of elastic impression materials but to the realization that the container (tube, shell or tray) must have both a high modulus of elasticity and a high elastic limit. The container must be stiff enough not to be distorted elastically during the application of the filled container over the region to be impressed. If the container is distorted elastically while the impression material is gelling or setting, the impression will be distorted permanently. The container must have a sufficiently high elastic limit to prevent its being permanently distorted while being withdrawn. If the elastic impression material is compressed between the container and the region impressed during the act of withdrawing the impression, the compressed material will exert a force against the container. If this force exceeds the elastic limit of the container, the latter will be distorted permanently and will hold the impression material in a distorted pattern.

The water cooled trays used to contain reversible hydrocolloid have both a sufficient modulus of elasticity and an adequate elastic limit. The resin trays also satisfy these two physical properties, provided the trays are thick enough. Copper tubes, however, have been the cause of much disappointment with the rubber material. The usual copper tube is too soft and is, therefore, permanently distorted during the withdrawal of the impression, either by compression of the rubber against the tube or by finger pinching, or the tube is too flexible and is elastically distorted when carried over the tooth. Ordinarily, the presence of an adjacent tooth does not permit satisfactory compound reinforcement of the tube prior to taking the impression. The only copper tubes recommended for inlay impressions with the rubber material are 30 gauge, work-hardened copper shells, now available.

CLEARANCE OF TOOTH AND CONTAINER

Another important factor is proper clearance between the object to be impressed and the container conveying the material. The impression material must record undercuts which are outside the cavity outline. While being withdrawn from undercuts, the material is compressed in

some directions and distended in others. This compression and distention should be elastic; that is, there should be no "set" or permanent change in shape. This change in shape can be completely elastic only if there is sufficient dimension to the material, provided at the start by proper clearance between the tooth and container.

For example, if 4 mm. of material is compressed to 3 mm. in order to pass over a height of contour on the tooth, the material is being compressed 25 per cent. If the maximum elastic strain of this material is 75 per cent (this is the figure given for reversible hydrocolloid),[13] then a 25 per cent strain should not produce any significant "set" or permanent distortion. If, on the other hand, 1.2 mm. of material must be compressed 1 mm. during the withdrawal of the impression, the material is being strained 83.3 per cent, which is likely to produce permanent distortion, or even fracture.

It is advisable to have about 3 mm. of material between the tooth and the container; for this reason and for other reasons the use of trays rather than copper shells is recommended.

ATTACHMENT OF MATERIAL TO CONTAINER

Another cardinal principle of impression taking with the elastic materials is to maintain the attachment of the material to the container. For reversible hydrocolloid, both the rim lock, nonperforated water-cooled trays and the perforated water-cooled trays provide satisfactory results.

Attachment of the rubber material to the container formerly was provided by scoring or roughening the container surface with burs or abrasive stones. Recently, manufacturers of the rubber material have provided adhesives which maintain the attachment of the rubber to the container without a roughened container surface, regardless of whether the container is a copper band, resin tray, or compound lined tray. The adhesive should be applied over the entire container surface. Ten minutes for drying the adhesive is allowed before the rubber material is applied for the impression. No trouble has resulted from adding the adhesive to the trays days ahead of the time when they will be used.

IMPRESSION WITHDRAWAL

A "snap" withdrawal of the reversible hydrocolloid is a requisite to success, but is unnecessary with the rubber material.

One manufacturer of the rubber has cautioned against having the tooth surface dry, since this makes it difficult to part the material from the tooth surface. Although the separation is more difficult from a dry tooth surface, when the material is permitted to "cure" sufficiently before withdrawal, its superb resiliency will protect it against permanent distortion during withdrawal.

CAVITY PREPARATION

If reversible hydrocolloid is to be used for the impression, the proximal buccal and lingual margins should be extended well into the buccal and lingual embrasures (Fig. 2, left). This extension should be accomplished by "rolling out" or flaring the enamel portions of the proximal buccal and lingual walls, so that these walls form a more obtuse angle with the external tooth surface. These "stubbier" margins do not cut the impression material which must pass over them when the impression is being withdrawn. This feature in cavity preparation also avoids tearing the hydrocolloid on withdrawal, which occurs inevitably when the buccal or lingual margins are too close to the adjacent tooth. This

13. Paffenbarger, G. C. Hydrocolloid impression materials: Physical properties and a specification. J.A.D.A. 27:373 March 1940.

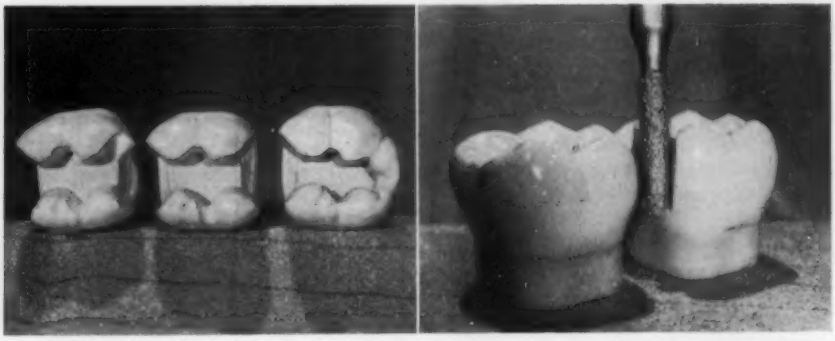

Fig. 2 • Left: The proximobuccal and lingual margins should be well extended into buccal and lingual embrasures as illustrated in center model and model to the right of it. The proximobuccal wall and margin of model to the left have not been properly extended into the buccal embrasure. Right: A small, flame-shaped diamond stone is used to "sweep out" the proximal enamel walls and margins, and to create the gingival bevel

modified cavity preparation also minimizes the degree of undercut on the external tooth surface near the proximal margin (Fig. 1).

The buccal proximal walls on the mesial surfaces of upper bicuspids and first molars should not be flared, for esthetic reasons.

When rubber impression material is used, the need to so modify the cavity impression is not as critical because of the material's greater resiliency.

The "sweeping out" of the proximal enamel walls and margins can be accomplished efficiently by using the small flame-shaped diamond stone with a speed of 20,000 rpm, a light touch, and a coolant spray, in the final step of cavity preparation (Fig. 2, right). This stone is used (with a slower speed to increase the sense of touch) to create the bevel across the gingival margin, and to blend this gingival bevel with the buccal and lingual proximal walls.

REVERSIBLE HYDROCOLLOID

The tray impression method for indirect inlays utilizing reversible hydrocolloid has been presented adequately by others.[1-12] The following points should be emphasized:

1. Profound anesthesia of all sensory nerves to the region is essential. This reduces salivation substantially, and also allows the exposure of gingival margins without patient discomfort.

2. All gingival margins must be exposed to view before the impression. Cotton string packs and an 8 per cent solution of racemic epinephrine are worked into the gingival crevice (Fig. 3). The region should remain free of saliva to the end of the impression operation. The string should remain in place at least five minutes, and may remain longer without causing tissue damage.

3. The soft tissue recovery is uneventful when suitable gutta-percha temporary restorations are cemented to place with zinc oxide-eugenol cement after the impression has been taken.

4. The hydrocolloid impression should be poured within 15 minutes after its withdrawal from the mouth.

5. The most simple, efficient and satisfactory method of handling the impression to produce a satisfactory working model utilizes 0.0015 inch stainless steel

strips $\frac{4}{16}$ inch high. Two strips are inserted for each tooth which is removable on the model (Fig. 4, above). Insertion of these strips will not distort the dies if care is exercised in their placement (Fig. 4, below).

RUBBER BASE MATERIAL

The use of rubber base impression material for indirect inlays and crowns has been reported by Pearson,[14] Silver,[15] Bailey,[16] Rosentiel[17] and Skinner.[18]

The rubber material has been used in a tray for taking an impression of a quadrant containing one or more teeth

14. Pearson, S. L. New elastic impression material: a preliminary report. Brit. D.J. 99:72 Aug. 2, 1955.

15. Silver, Allen. Rubber elastic impression technique for fixed cast restorations. J. Soc. D. Res. 4:15 May 1955.

16. Bailey, L. R. Acrylic resin tray for rubber base impression materials. J. Pros. Den. 5:658 Sept. 1955.

17. Rosentiel, Edwin. Rubber base elastic impression materials. (A preliminary note). Brit. D.J. 98:372 June 7, 1955.

18. Skinner, E. W., and Cooper, E. N. Desirable properties and use of rubber impression materials. J.A.D.A. 51:523 Nov. 1955.

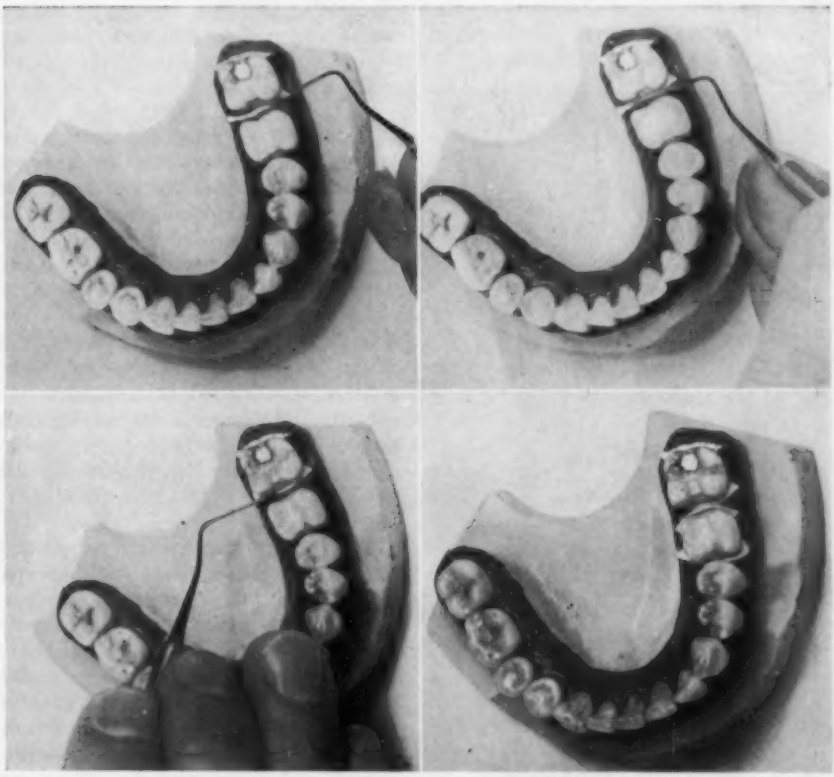

Fig. 3 • Suitable lengths of cotton string treated with epinephrine are worked into the gingival crevice to expose gingival margin and stop gingival hemorrhage and seepage. Above left: End of string is anchored into crevice. Above right and below left: Remaining length of string is worked into crevice. Below right: Insertion is completed, with small amount of string left exposed to facilitate removal just prior to insertion of impression material from the syringe

prepared for inlays on more than 40 occasions. All of the more than 100 inlays save one have been extremely satisfactory. The following observations were noted:

1. Profound anesthesia is necessary for the same reasons given for the tray method using hydrocolloid.

2. The gingival margins should be exposed prior to taking the impression.

3. Commercially produced resin half trays with no compound lining give satisfactory results. A compound lining in the tray creates an unstable rubber impression, whereas without the compound the impression can be poured days later with satisfactory results. Adhesive provided by the rubber manufacturer was applied to the trays to provide attachment of the rubber material. These inexpensive trays may be discarded after use.

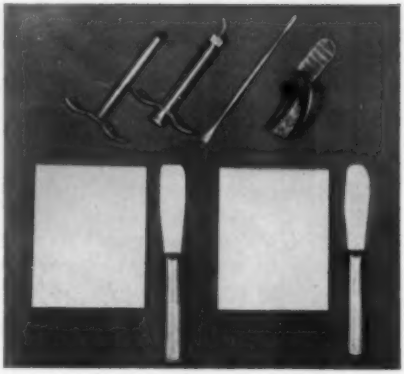

Fig. 5 • Armamentarium for Sturdevant rubber technic utilizing Barton-Sturdevant syringe

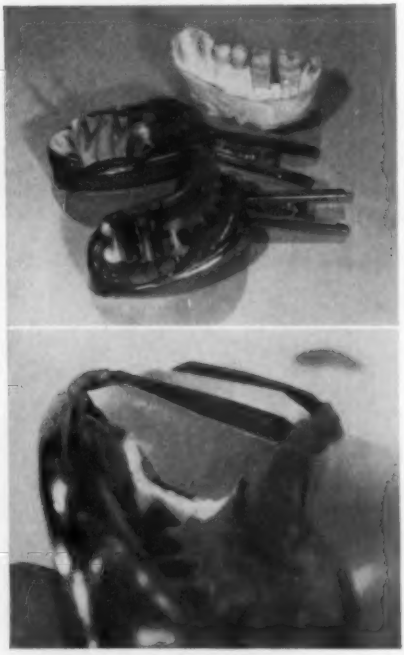

Fig. 4 • Above: A satisfactory method of handling reversible hydrocolloid utilizes 0.0015 inch stainless steel strips $\frac{1}{8}$ inch high. Below: Necessary clearance of at least 1 mm. between the gingival border of strip and reversible hydrocolloid is illustrated. Strips engage only buccal and lingual material

4. Although the trays do not require stops, these are desirable and can be made quickly of self-curing resin.

5. The blade of the mixing spatula should be stiff, at least one inch wide, polished, and should have at least one edge straight (Fig. 5). The mixing pads should be stiff. In mixing, the brown accelerator material is picked up first and incorporated into the white base material.

6. The high viscosity and fast setting time of the rubber mix at one time presented problems. Recently, however, manufacturers have provided a retarder to be added during mixing. This increases the setting time. A manufacturer has provided the author with a rubber that is more fluid and with a longer setting time. Another manufacturer is offering large plastic tubes which help to convey the more fluid rubber mix into the prepared cavity without trapping air (Fig. 6). The tubes were developed by R. E. Barton and the author; these two have

also developed a plastic tipped syringe to serve the same purpose more satisfactorily (Fig. 7, 8).

When the plastic tube is used, a slight inward crease is pressed in the side of the tube (Fig. 9). The crease prevents an air lock when the colored cap is slipped over the tube. After the more fluid rubber mix has been spatulated, the tube is filled, the cap is slipped over the tube, and a piece of Scotch tape (about 1½ inches long and ½ inch wide) is wrapped around the capped tube, with half the tape width over the cap and half on the tube. The tape prevents the cap from slipping off the tube as it is squeezed to eject the material through the tip. The point of the tube is kept on the gingival and pulpal walls to fill the prepared cavities from distal to mesial.

When the syringe is used, the rubber mix is transferred from the spatula to the back end of the barrel (Fig. 8). Most of the material remaining on the sides of the funnel is pressed into the barrel, using the convex side of the paddle end of a no. 7 spatula or other suitable instrument. When the piston is inserted and pushed, the material is ejected through the plastic tip. The tip can be maintained on the pulpal wall even in a narrow isthmus because the flexible plastic can be squeezed by the buccal and lingual walls as the tip is moved along the pulpal wall. The washers on the piston sweep the barrel clean. The funnel shape of the plastic tip permits the rubber in it to be removed in one piece after the rubber has set; any material remaining in the barrel can be removed easily.

7. A technic involving the use of two rubber materials, one for the tray and one for the syringe, has proved satisfactory. Two mixing pads and two spatulas are used (Fig. 5). On one pad is placed the more fluid material, two inches of the base material and an equal length of the accelerator. On the other pad is placed the more viscous tray material, four inches each of the base and accelerator. The tray material is spatulated first for 45 seconds or less and transferred by spatula to the prepared tray. The syringe material is spatulated with the clean, second spatula (this requires only 15 seconds) and loaded into the syringe or tube (another 15 seconds). The cotton packs are removed and the opened gingival crevices and cavity preparations are deliberately filled with material from the loaded syringe or tube, moving from distal to mesial, care being taken to cover all the prepared surfaces, including also the external tooth surface adjacent to the cavity margins, without trapping air.

The operator need not hurry to eject the rubber material, as would be necessary with reversible hydrocolloid. The cotton rolls are removed and the loaded tray is carried to place. The impression is not removed until the material has developed the required resiliency; this will be a minimum of ten minutes from the start of mixing. To determine the setting time, some material is ejected

Fig. 6 • Capped plastic tube conveys fluid rubber mix into opened gingival crevices and prepared cavities without trapping air, previous to insertion of the plastic tray which is loaded with a more viscous rubber mix

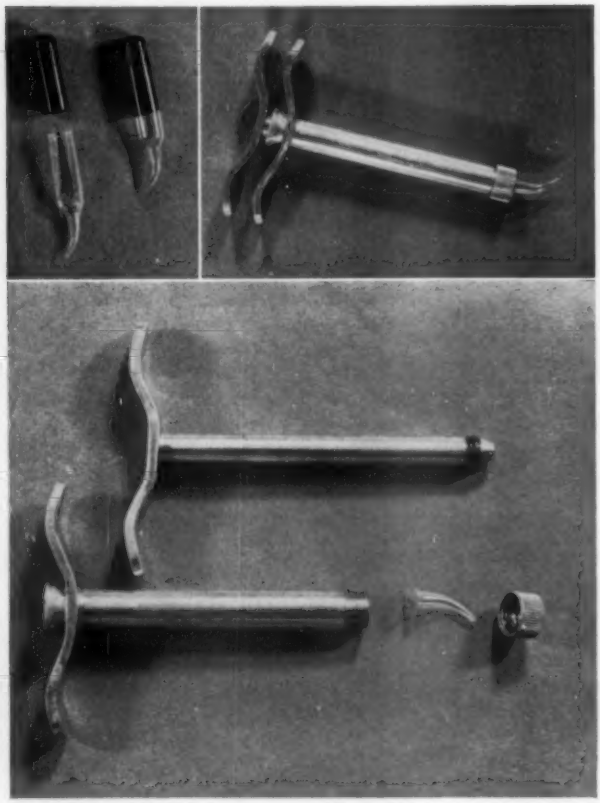

Fig. 7 • Above left: Large plastic tubes. Above right: The Barton-Sturdevant syringe. Below: "Exploded" view of syringe

from the syringe (while the tray is steadied with the other hand) through the gingival embrasure between two anterior teeth not covered by the tray. The moment when this material can recover elastically from a poke with a sharp instrument should be noted.

When the dentist is working alone or when the temperature of the material and of the room is high, the setting time of the material can be increased by adding one small drop of retarder to each inch of accelerator.

8. At least ten minutes should be allowed from the start of mixing to completion of setting before the material is withdrawn.

9. The tray impression may be poured several days later. The delay will not result in inaccuracy.

10. The use of 0.002 stainless steel strips $\frac{5}{16}$ inch high helps to produce a satisfactory model with removable dies (Fig. 10). The strips are pre-cut so that they will not quite touch the impression of the prepared tooth when in proper position. There are two strips for each tooth which is removable in the model. The strips are warmed and inserted into utility wax about 1 mm. thick which has been attached to the buccal and lingual surfaces of the impression.

11. The surface of the dies from the rubber impression is superior to the sur-

face of the dies from reversible hydrocolloid.

12. When the impression is of the tray type, a second pouring is possible if the first model is defective. If the impression is of the tube type, a second pouring is usually unsatisfactory.

13. Efforts to correct defective rubber impressions by adding a small amount of newly mixed rubber to either the tooth or the impression and then reseating the impression are usually unsatisfactory.

14. Before the impression is taken, a thin film of cocoa butter is applied over any adjacent proximal filling which does not have a high polish, and over any zinc oxide-eugenol base in the prepared cavities; otherwise, the rubber may adhere to these.

15. If self-curing resin stops are not employed, and if in the completed impression there is excess material beyond the posterior limit of the tray, the impression must not rest on this excess; otherwise, distortion of the posterior portion will eventually occur because of the flow of the material. This explains the one failure previously mentioned.

SUMMARY

1. Elastic impression materials and improved impression technics have brought about an improvement in the indirect method for making inlays.

2. The new rubber impression material is as good as, or superior to, reversible hydrocolloid.

3. The container of the elastic impression material must have both a sufficiently high modulus of elasticity and an adequate elastic limit.

4. About 3 mm. of elastic impression material should be placed between the tooth and the container; for this reason, and for others, trays are superior to copper shells.

5. A new adhesive maintains the attachment of the rubber material to the container.

Fig. 8 • The more fluid rubber mix is conveyed into the flat-sided funnel at back end of barrel of syringe

Fig. 9 • A slight inward crease is pressed in side of plastic tube

Fig. 10 • The use of 0.002 inch stainless steel strips $\frac{1}{8}$ inch high facilitates handling rubber impression. The pre-cut strips are inserted warm into utility wax attached to buccal and lingual surfaces of impression

6. A rubber impression in a compound lined tray must be poured within three hours; if compound is not used to line the tray, the impression may be poured days later.

7. Sufficient setting time for the rubber material should be allowed to achieve resiliency. At least ten minutes from start of mixing is recommended as being sufficient.

8. The enamel portion of the proximal buccal and lingual walls of the cavity preparation should be flared well into the buccal and lingual embrasures, wherever compatible with esthetics.

9. The tray method of impression taking is recommended.

10. Salivation must be controlled by profound local anesthesia for the tray impression technic.

11. The rubber material is remarkably stable.

12. The surface of dies from the rubber impression is superior to that of dies from reversible hydrocolloid.

13. A rubber impression of the tray type permits a second pouring.

14. It is not recommended that an attempt be made to correct a rubber impression by adding newly mixed rubber and reseating.

15. An impression technic is recommended which revolves around the simultaneous use of two rubber materials of different viscosities, and a newly designed plastic tube or plastic tipped syringe.

A simple technic for making dental porcelain jacket crowns

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The idea that dentistry is both an art and a science is peculiarly applicable to the use of fused porcelain as a restorative material. The making of a porcelain jacket crown probably requires a greater degree of artistic skill than that needed for any other dental restoration. This artistic skill must be combined with a thorough knowledge of the physical properties of the porcelain if a beautiful result is to be achieved. These facts account for the infrequent use of the fused porcelain jacket crown in places where it unquestionably should be the first choice. Frequently, the acrylic resins, which have not proved satisfactory, are substituted for fused porcelain in jacket crown restorations.

The principal reasons why porcelain jacket crowns are not as widely used as they should be are: (1) the difficulty in producing the correct color and trans-

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lucency in different parts of the jacket crown so that it will be indistinguishable from the adjacent and opposing natural or artificial teeth; (2) the skill needed to mold a crown of the correct size and shape that will harmonize with the other teeth of the patient; (3) the experience and skill required in fusing the porcelain; (4) the comparatively long time required to make a porcelain jacket crown by the current classical technic, which was invented and perfected by Charles H. Land[1] at the beginning of the twentieth century.

It is the purpose of this report to present a technic that will minimize the foregoing difficulties.

OUTLINE OF TECHNIC

An artificial porcelain tooth of proper size, shape, and color is ground to an approximate fit of the tooth preparation in such a way as to serve as a labial and proximal veneer for the crown. This procedure is almost identical to that proposed by Edward B. Spalding[2] in 1904 after Land had showed him the fused porcelain crown. Spalding powdered porcelain teeth and used this powder to fill in the parts of the crown not supplied by the veneer. Thus, the porcelain used in completing the crown fused at the same temperature as the veneer and therefore required the utmost skill in handling. In the technic here presented, a layer of a mix of powdered porcelain teeth and a low-fusing porcelain is first applied, then a layer of low-fusing porcelain is placed over this first layer for the first bake, and low-fusing porcelain is used for the second bake.

PREPARATION OF CROWN FOR FIRST FUSION

Preparation of Tooth • The classical shoulder preparation as used in crown and bridge and porcelain work is used in preparing the tooth.

Impression of Prepared Tooth • The impression of the prepared tooth is the one commonly used in the indirect method. The festooned copper band filled with an impression compound or a rubber base impression material is employed. The impression is boxed in and an artificial stone die prepared in it.

Baseplate Wax Impression of Prepared Tooth • A triangular piece of baseplate wax is warmed, folded to form a cone, pressed over the preparation, trimmed to relieve the proximal and incisal surfaces, and scored to cause it to withdraw with the subsequent impression. This wax covering is shown in position in Figure 1, left.

Impression of Adjacent Teeth • A hydrocolloidal or rubber base impression is then taken of the wax covered preparation and the adjacent teeth. On withdrawal, the baseplate wax impression stays in the hydrocolloidal or rubber impression.

Making Model • The greased artificial stone die (the replica of the tooth preparation) is seated into the baseplate wax impression of the preparation and sealed with hot wax. Then the model is poured.

Matrix on Which Porcelain Is Fused • Because a low-fusing porcelain is employed (the one used by the authors is "Apco" fusing at 1024°C. [1875°F.]), the matrix is prepared on the artificial stone die with gold foil, 0.001 inch thick.

Selection and Preparation of Artificial Tooth • A porcelain tooth of approximately the correct shape, size, and color is selected. The pins are cut off with a silicon carbide disk and the lingual surface hollowed out by diamond stones

1. Land, C. H. Porcelain dental art. D. Cosmos 45:437 June 1903.

2. Spalding, Edward B. Replacing the entire natural enamel with porcelain. D. Cosmos 46:467 June 1904.

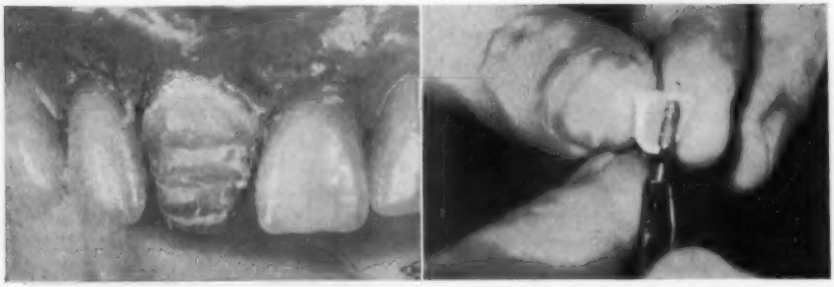

Fig. 1 • Left: Baseplate wax impression of preparation in place prior to taking impression of front section of upper arch. Right: Finishing lingual surface of porcelain tooth with diamond cylinder

(Fig. 1, right) to fit the labial and proximal surfaces of the preparation. It may be necessary to remove some porcelain from the incisal, cervical, or proximal surfaces so that the veneer is in proper alignment and approximately fits the die. A lingual view of the veneer at this stage is shown in Figure 2. It is good practice to try the veneer in the mouth now so that both the dentist and patient can see the approximate color and shape of the labial face of the crown as it will appear when completed.

Preparation of Powdered Porcelain Teeth • Four or five light-colored porcelain teeth of any of the current brands are crushed in a diamond mortar (Fig. 3, left) and are screened on standard sieves (Fig. 3, right). The portions that (1) pass through no. 40 sieve but are retained on the no. 70 sieve and (2) pass through the no. 70 sieve but are retained on the no. 100 sieve are mixed in equal portions. This size distribution, selected by trial and error, produces a low shrinkage on fusion when mixed with low-fusing porcelain, yet presents a surface after fusion that is smooth and glazed.

Placing the Porcelain for the First Bake • A color of the low-fusing porcelain which approximates that of the veneer is selected. An exact match is not necessary. A dry mix of equal portions of the low-fusing porcelain and the powdered porcelain teeth is made on the slab.

A thin layer of the low-fusing porcelain-water mixture is painted on the labial surface of the preparation with a heavier amount on the labial shoulder (Fig. 4, left).

A thin layer of the aqueous mixture of low-fusing porcelain and powdered porcelain teeth is applied to the lingual surface of the veneer, with a heavier amount in the incisal area (Fig. 4, right).

The veneer facing is then placed in position on the die, and the porcelain is condensed by the classic method of vibration with a serrated instrument and by blotting the excess water brought to the surface.

The die is now placed in the model, and the alignment of the veneer is checked. If incorrect, the condensed porcelain is touched with a wet brush to facilitate moving the veneer to proper alignment. The porcelain is again dried by blotting.

The die is removed from the model, placed in the inlay holder, and held in position with the fingers (Fig. 5, left).

The mixture of powdered porcelain teeth, low-fusing porcelain, and water is now painted on the lingual surface, the largest bulk being placed on the marginal ridges, lingual shoulder, and the cingu-

Fig. 2 • Lingual aspect of porcelain veneer on model. Veneer was made as shown in Figure 1, right

lum (Fig. 5, center). Water is brought to the surface by careful vibration with the serrated instrument and is removed by blotting. Crumbs of porcelain are removed with a no. 5 red sable hair brush.

Low-fusing porcelain only is now applied to the proximal and incisal portions of the crown. The operator must make certain that the porcelain overlaps the veneer (Fig. 5, right). The porcelain is again condensed by vibrating and blotting carefully, and loose crumbs are removed with the large brush as previously described. The proximal surfaces are gently burnished with the flat side of the spatula and again brushed. The gingival margin is cleaned with a small, wet no. 00 red sable hair brush. The crown is now ready for the first fusion.

FIRST FUSION OF CROWN

The furnace (Fig. 6) can be regulated so that it will be at 593° to 649°C. (1100° to 1200°F.) when the application of the porcelain for the first bake is completed. The crown is removed, placed on the firing tray, and set on top of the muffle to dry (A in Fig. 6). The temperature of the furnace is then advanced to 738°C. (1400°F.) in three to four minutes. At this temperature the muffle door is opened, and the tray with the crown is shifted from the top of the muffle to the shelf (B in Fig. 6) just below the opening of the muffle and is left there from one to two minutes. By this time the temperature of the furnace has drifted to 593° to 649°C. (1100° to 1200°F.).

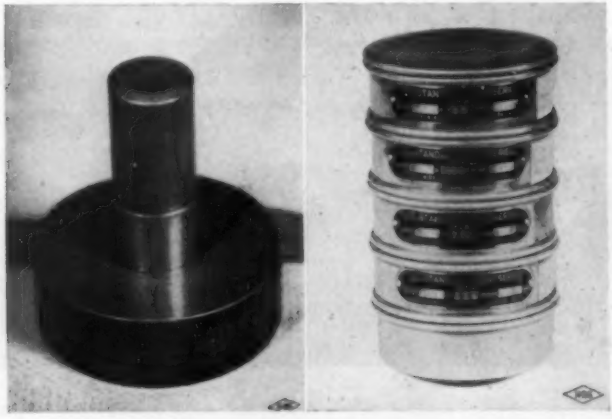

Fig. 3 • Left: Diamond mortar used in powdering stock porcelain teeth. Right: Set of U.S. Standard sieves used for obtaining desired particle sizes

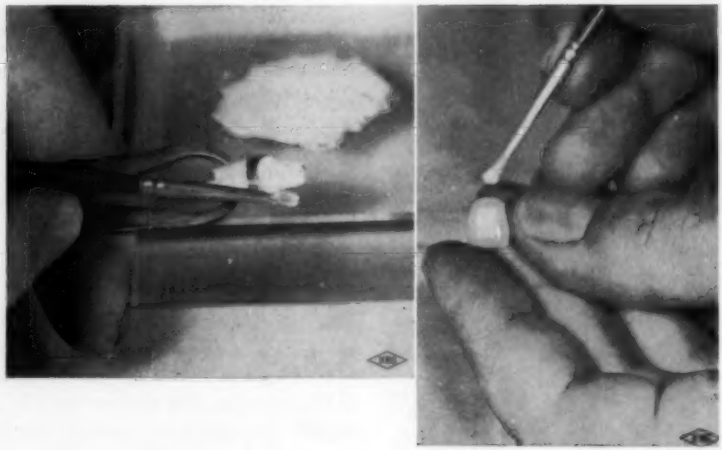

Fig. 4 • Left: Application of low-fusing porcelain-water mixture to labial surface of die with no. 3 sable brush. Note heavier coating on labial shoulder. Right: Application of thin layer of aqueous mixture of low-fusing porcelain and powdered teeth to lingual surface of porcelain veneer. Note heavier coating in incisal area

(These time-temperature relationships will, of course, vary with the type of furnace used. The authors employed an S. S. White No. 3.)

The tray is now placed in the muffle so that the crown will be beneath the thermocouple junction. The door is returned to the shelf below the muffle opening, which leaves a space between the door and the muffle (C in Fig. 6). This space is gradually closed until the furnace reaches 1400°F. This requires three to four minutes. The furnace is now raised to 982°C. (1800°F.) in 55°C.

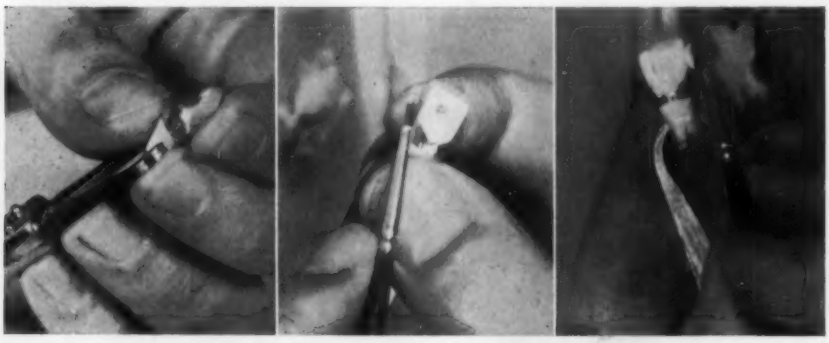

Fig. 5 • Left: Position of fingers for maintaining proper alignment of porcelain veneer. Center: Aqueous mixture of low-fusing porcelain and powdered porcelain teeth being painted on lingual surface; bulk of porcelain has been placed on marginal ridges, lingual shoulder and on cingulum. Right: Application of porcelain to proximal surfaces to overlap porcelain veneer

(100°F.) intervals, spaced approximately three minutes apart. When 982°C. (1800°F.) is reached, the temperature is immediately reduced over a period of five to six minutes to 816°C. (1500°F.), then the firing tray and crown are removed and placed under a beaker until the crown can be handled (D in Fig. 6).

Fig. 6 • Furnace used in fusing crown. A is initial position of crown on top of muffle (Steps 2 and 3 in Table 1). B is shelf where crown is placed in Step 4, Table 1. C shows initial position of door in Step 5, Table 1. D shows fused crown cooling under glass beaker

PREPARATION FOR AND SECOND FUSION OF CROWN

The cooled crown is seated on the die, which is then inserted into the model to check for alignment and contact points (Fig. 7, left). Sometimes it is necessary to relieve the contact point by grinding so that the crown may be seated properly.

The die and crown are again mounted in the holder, and the crown is moved up and down slightly to make certain that the matrix is not stuck to the die.

The lingual anatomy is completed by painting the low-fusing porcelain-water mixture on the marginal ridges, the cingulum, and the central lingual area. The porcelain is again condensed by gentle vibration with the serrated instrument. If the vibration is too vigorous, the contours of the marginal ridges and cingulum may be lost as the porcelain flows. After burnishing and cleaning with the large dry brush and a small wet brush, the crown is ready for the second fusion.

The schedule of the second fusion follows that of the first fusion except that the final temperature is 1024°C. (1875°F.) instead of 982°C. (1800°F.).

A schematic description of the firing schedule is given in Table 1.

PREPARATION OF CROWN FOR CEMENTING

When the crown is cool enough to handle, water placed in the matrix aids in its removal (Fig. 7, center). The gold matrix is teased from the crown with cotton tweezers (Fig. 7, right).

Any overhanging fin of porcelain at the gingival margin is removed carefully with a small round silicon carbide mounted stone. The crown is now ready for cementation.

Zinc phosphate cement is mixed on a chilled slab to the heaviest cementing consistency. An exact match of the color of the cement and the color of the crown is not necessary. The cement is placed in the crown and not on the preparation. The patient is instructed to hold the crown in position as the cement is hardening. The excess hardened cement is carefully removed from the gingiva.

The points of contact between the porcelain jacket crown and the opposing teeth at rest and in motion are checked

Fig. 7 • Left: Checking crown for alignment and contact points after first fusion has been completed. Center: Placing water in matrix to facilitate its removal. Right: Method of peeling matrix out of crown.

with articulating paper. High spots are removed from the porcelain by grinding. Even if there are no high spots, the glaze on the lingual surface of the porcelain crown should be removed in those areas where contact with the opposing teeth is anticipated. The natural teeth are abraded by the ground surface of the porcelain, and thus occlusal trauma is prevented.

DISCUSSION OF TECHNIC

Simplification of Color Matching • The use of a fused porcelain veneer formed from a stock porcelain tooth simplifies

Table 1 • Time-temperature scheme for fusing porcelains

Step	First fusion			
	Schedule	Time	Temperature of furnace	
		Min.		
1	Begin application of porcelain (Fig. 6) and turn furnace on	0	Room temperature	
			°C.	°F.
2	Complete application of porcelain and place crown on top of muffle	10	595 to 650	1100 to 1200
3	Leave crown on top of muffle	3 to 4	↓ 760 ↓	↓ 1400 ↓
4	Remove muffle door and shift tray from top of muffle to shelf below door	1 to 2	595 to 650 ↓	1100 to 1200 ↓
5	Place tray in muffle so that crown will be under junction of thermocouple. Return door to shelf, but have it ajar at first. Gradually close opening	3 to 4	760 ↓	1400 ↓
6	Raise temperature of furnace in 55°C. (100°F.) intervals spaced about 3 minutes apart	12	980	1800
7	Reduce temperature immediately	5 to 6	810	1500
8	Remove crown and place under glass beaker to cool		Room temperature	
	Second fusion			
	The second fusion follows the pattern of the first except that the final temperature is carried to 1025°C. (1875°F.) instead of 980°C. (1800°F.).			

the matching of color and translucency of adjacent teeth. This color match can be checked directly in the mouth with the porcelain veneer. The color of the veneer does not change on firing because subsequent fusions are made at temperatures well below the fusion temperature of the veneer.

The selection of any of the light colors of powdered teeth is satisfactory, and only an approximate match is necessary between the color of the low-fusing porcelain and the veneer and between the color of the zinc phosphate cement and the crown. With the classical technic the matching and the reproduction of the colors and opacities are difficult to achieve.

Reduction in Carving of Anatomy • There is no change in the contour of the veneer during the firings, as its fusion temperature is much higher (1288°C. [2350°F.]) than that of the low-fusing porcelain (1024°C. [1875°F.]) used on the lingual surface of the crown. Thus, the labial, proximal, and incisal areas are largely established by the veneer. In contrast, the carving and the making of the porcelain jacket crown with high-fusing porcelain alone is so difficult that only a small number of porcelain experts attempt it.

Reduction in Firing Shrinkage • The large firing shrinkage of either high-fusing or low-fusing porcelain is a great handicap to the dental porcelain worker. If the technic described herein is used, the firing shrinkage of the porcelain is greatly reduced. The large bulk of the crown is the veneer in which there is no shrinkage within the heating range used during the firing of the crown (room temperature to 1024°C. [1875°F.]). Also, the fusion shrinkage of the mixture of low-fusing porcelain and the powdered porcelain teeth is less than the fusion shrinkage of either low-fusing or high-fusing porcelain (Table 2) and amounts to a reduction of 29 per cent of that portion of the crown in which this mixture is used.

Table 2 • Firing shrinkage of fused dental porcelains

Brand name	Type of porcelain	Firing* shrinkage-% by vol.	Standard† deviation
Apco	Low-fusing 1024°C. (1875°F.)	38	1.9
Apco 50% Powdered Trubyte (New Hue) teeth 50%	Mixture of low and high-fusing 1288°C. (2350°F.)	27	1.0
	Low-fusing 927°C. (1700°F.)	38	0.8
S.S. White	High-fusing 1338°C. (2440°F.)	37	1.9

*Average of ten specimens.

†S.D. $= \sqrt{\frac{\Sigma(\bar{x}-x)^2}{n-1}}$

These determinations of the shrinkage on fusion of several porcelains (Table 2) were made on cylinders approximately 10 mm. high and 6 mm. in diameter, by hydrostatic weighing. The porcelain-water mixture was compacted into the mold in much the same manner as described in making the jacket crown. The heating schedule of all of the porcelains listed in Table 1 was the same as that used in fusing the crowns, except that the directions of the manufacturer were followed in firing the high-fusing porcelains.

Other investigators have reported firing shrinkages as low as 24 per cent and as high as 48 per cent by volume.[3-5] Variations among the data could be attributed to the size and shape of the specimens, the method of condensation, and the time-temperature schedule of fusing.

3. Gill, J. Raymond. Pyrochemical reactions in the firing of porcelain. J.A.D.A. 18:280 Feb. 1931.

4. Sayre, L. D. The effects of varying manipulation upon certain physical properties of a dental porcelain. Northwestern Univ. Den. Res. & Grad. Quar. Bul. 38:3 May 2, 1938.

5. Skinner, E. W., and Fitzgerald, P. A. Physical properties of dental porcelains. J.A.D.A. 25:861 June 1938.

Table 3 • Thermal expansion of fused dental porcelains and human teeth

Porcelain	Coefficient 30—400°C.
	x10⁻⁶*
Apco—Low-fusing (1024°C.) (1875°F.)	7.8
Apco (1024°C.) (1875°F.) 80% Powdered Trubyte—New Hue teeth (1288°C.) (2350°F.) 20%	7.9
Powdered Trubyte—New Hue teeth (1288°C.) (2350°F.)	7.9
S. S. White high-fusing (1338°C.) (2440°F.)	6.4
Teeth (7)†	20—50°C.
Tooth (root)	8.3
Tooth (across crown)	11.4
Tooth (root and crown)	6.4
	8.7
	8.3

*Average of duplicate tests.

†Souder, W., and Peters, C. G. Investigation of physical properties of dental materials. D. Cosmos 62:305 March 1920.

PROPERTIES OF MATERIALS USED

Thermal Expansion • The thermal expansion of a low-fusing and of a high-fusing porcelain of powdered porcelain teeth and of a mixture of low-fusing porcelain and powdered porcelain teeth was determined over the range of 30 to 400°C. (86 to 752°F.) by an automatically recording interferometric method.[6] The data (Table 3 and Fig. 8) show that there are no important differences in the thermal expansions of the various porcelains used in fabricating the crown. Certainly no significant strain should be set up in the crown during cooling that could be attributed to the small differences in the coefficients of thermal expansion among the porcelains used.

The data in Table 3 also show that the thermal expansion of the fused porcelain jacket crown approaches closely that of the tooth. This approximate matching of the thermal expansion of a restorative material with that of the tooth is of great clinical importance. As previously demonstrated, it has a direct bearing on the fluid exchange at the margins of dental restorations that occurs with a change of temperature in the mouth when hot and cold foods are eaten.[7]

Compressive Strength • The cylinders used in determining the volumetric shrinkage on fusing were trued and used for determining the compressive strength. The walls of the cylinders were paralleled, and the ends were made flat and at right angles to the long axis of the cylinder by grinding the spinning cylinder with a revolving diamond-coated wheel. The resultant specimens were 7 ± 1.5 mm. in height and 4 ± 0.7 mm. in diameter, depending on the amount of truing neces-

6. Saunders, J. B. An apparatus for photographing interference phenomena. J. Res. Nat. Bur. Stand. 35:157 Sept. 1945.

7. Nelsen, R. J.; Wolcott, R. B., and Paffenbarger, G. C. Fluid exchange at the margins of dental restorations. J.A.D.A. 44:288 March 1952.

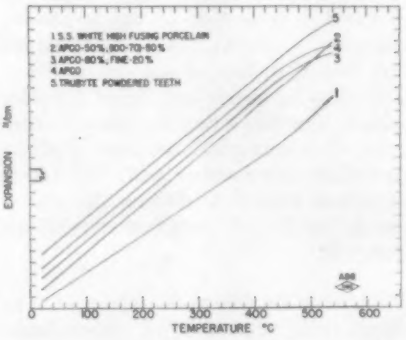

Fig. 8 • Thermal expansion of dental porcelains. Curve 1. S. S. White high-fusing porcelain (1338° C.) (2440° F.). Curve 2. Apco low-fusing porcelain (1024° C.) (1875° F.) 50 per cent and powdered Trubyte New Hue teeth (1288° C.) (2350° F.) 50 per cent. Particle size of powdered teeth consisted of equal portions that (1) pass through no. 40 sieve but are retained on no. 70 sieve and (2) that pass through no. 70 but are retained on no. 100 sieve. Curve 3. Apco low-fusing porcelain (1024° C.) (1875° F.) 80 per cent and powdered Trubyte New Hue teeth (1288° C.) (2350° F.) 20 per cent. Powder size of powdered teeth would pass no. 70 but be retained on no. 100 sieve. Curve 4. Apco low-fusing porcelain (1024° C.) (1875° F.). Curve 5. Powdered Trubyte New Hue teeth (1288° C.) (2350° F.)

sary. The load was applied at the rate of 500 pounds per minute. The data (Table 4) show that there are no appreciable differences among the compressive strengths of the low-fusing and the high-fusing porcelain and the mixture of low-fusing porcelain (80 per cent) and the powdered porcelain tooth (20 per cent). The mixture of low-fusing porcelain (50 per cent) and of powdered porcelain teeth (50 per cent) has about one fourth the strength of the other porcelains in Table 4. This low compressive strength of the 50-50 mixture was thought at first to rule out such a mixture in fabricating the porcelain jacket crown. However, repeated cross-sectioning of fused crowns showed no difference in the appearance of the veneer, the mixture of low-fusing porcelain (50 per cent) and the powdered porcelain teeth (50 per cent), and the low-fusing porcelain zones. There was no stratification visible, as the different layers had all blended together. The low-fusing porcelain layer in the crown had evidently permeated the layer of the mixture, which no longer remained a 50-50 mixture and was probably closer to the 80-20 mixture. An inspection of cross sections of specimens of the 50-50 mixture used in determining its compressive strength showed that insufficient low-fusing porcelain was available for fusing the particles of the powdered porcelain teeth together under the conditions of fusing.

Table 4 • Compressive strength of fused denta porcelains

Porcelain	Compressive strength	
	lb./in.²*	Standard† deviation
Apco low-fusing (1024°C.) (1875°F.)	48,000	11,000
Apco low-fusing (1024°C.) (1875°F.) 80% Powdered Trubyte—New Hue teeth (1288°C.) (2350°F.) 20%	39,000	10,000
Apco low-fusing (1024°C.) (1875°F.) 50% Powdered Trubyte—New Hue teeth (1288°C.) (2350°F.) 50%	12,000	1,000
S. S. White high-fusing (1338°C.) (2440°F.)	48,000	3,600

*Average of five specimens.

†S.D. $= \sqrt{\frac{\Sigma(\bar{x}-x_i)^2}{n-1}}$

Table 5 • Solubility of fused dental porcelains in 4 per cent solution of acetic acid

Porcelain		Weight loss-%*
Apco low-fusing (1024°C.) (1875°F.)		0.3
S.S. White low-fusing (927°C.) (1700°F.)		0.2
S. S. White high-fusing (1338°C.) (2440°F.)		0.1
Apco low-fusing (1024°C.) (1875°F.)	50%	
Powdered Trubyte New-Hue teeth (1288°C.) (2350°F.)	50%	0.2

*Average of duplicate tests.

Just as the compressive strengths of the high-fusing and low-fusing porcelains were approximately the same (Table 4), so were the strengths in transverse bending of similar porcelains reported by Fitzgerald.[8] The correlation of the brand names with the data of Fitzgerald is given by Moldal.[9]

Solubility • The solubility of the various porcelains in a 4 per cent solution of acetic acid is shown in Table 5. Each porcelain was fired at the temperatures given in the table and was then powdered in the diamond mortar (Fig. 3, left). Only that portion which would pass a no. 200 sieve (Fig. 3, right) was used. A 2 Gm. sample of this powdered fused porcelain was boiled for 30 minutes in 200 ml. of a 4 per cent solution of acetic acid. This solution-powdered porcelain mixture was passed through a tared porce-

8. Fitzgerald, P. A. Physical properties of dental porcelains. Northwestern Univ. Bul. 37:5 Nov. 1939.

9. Moldal, O. H. Physical properties of opaque porcelain. Northwest. Univ. Bul. 39:7 April 3, 1939.

lain filter, which was then placed in a furnace at 150°C. (292°F.) for one hour, cooled in a desiccator, and weighed. The test is patterned closely after that of Koenig[10] who employed it to test frits and glazes used on enamelware for the household.

There are slight differences in the solubility of the different porcelains listed in Table 5. No literature was found showing that any of the porcelains tested would distintegrate or etch in the mouth. During ten years of clinical experience, the senior author has not observed the etching of porcelains listed in Table 4.

SUMMARY

A rapid, precise, and comparatively simple technic for fabricating fused porcelain jacket crowns has been developed. The essential features of the technic are the employment of a prefabricated fused porcelain veneer and of two porcelains having widely different fusion temperatures. The matching of the anatomy, the color, and the translucency are largely predetermined by those of the porcelain veneer, which can be tried in the patient's mouth when the preparation of the tooth is completed. Shrinkage on fusion has been greatly reduced and the number of fusions has been cut from the four or five needed in customary technics to two.

10. Koenig, J. H. Lead frits and fritted glazes. Bulletin No. 95, The Engineering Experiment Station, Ohio State University, vol. 6, July 1937.

The Importance of Character • If there is one lesson which history has taught us, it is the fundamental importance of will power, as much for nations as for individuals, and in every circumstance of life, great or small. Greek civilization ended in failure, not because of the lack of intelligence, but because of the lack of character, of morality. *George Sarton, Introduction to the History of Science.*

You—savings bonds—and your income taxes

Robert W. Reese, Washington, D. C.

A professional man or woman is a person of better than average intelligence in whom training has developed special skills and informed judgment. It does not always follow that this makes him or her a good judge of investments, as that special skill and judgment, too, has to be developed by study and practice.

Lacking time for such study, but desiring the fruitful yield of successful investments, a person in the professions may seek the services of an investment expert. Concerned first with safety, then with the probable yield of investments, the conscientious investment counselor will condone taking long chances only with that money that the investor can well afford to lose. He will recommend what he calls a "diversified portfolio" made up of life insurance, U. S. savings bonds, and after that, sound stocks, including "blue chips." Ahead of investments come, of course, a checking account for current expenditures and a savings account for short-range future needs.

Savings bonds meet the safety requirements completely and their yield is sure. Principal and interest are guaranteed by the United States Treasury which, since it was founded under Alexander Hamilton, has never failed to pay its obligations in full. The cash value of savings bonds is not subject to market fluctuations and any savings bond lost, stolen, mutilated or destroyed will be replaced with another bearing the same issue date, so there can be no loss. This makes U. S. savings bonds safer than currency and is one reason why they are called "absolutely indestructible" investments.

There is another advantage of these bonds that the investment counselor would point out: their tax saving possibilities. This accounts partly for the popularity of E bonds among substantial investors, as indicated by the sales of $500, $1,000 and $10,000 denominations, and the continued holding of around 70 per cent (in dollar value) of these bonds after they have matured.

If reported on the basis of cash receipts, as is done in most instances, the bond owner has the option of reporting accrued interest on E bonds in each year's federal income tax return—savings bonds are exempt from state and local income taxes—or deferring the tax payment to the year in which a bond is actually cashed. If he or she has been paying tax on the accrual each year, permission must be obtained from the Treasury to change to the deferred basis. Income tax instruction leaflets tell how.

If retirement is planned, wholly or partially, within 20 years and the bond owner expects to drop to a lower income bracket, it may be wise to put off paying the tax on E bond accruals until retirement, and the time of cashing the bonds.

Under the present law, personal exemption doubles, beginning at age 65, from

Public information officer, Treasury Department, savings bonds division.

Table • Money invested in U.S. savings bonds and its earnings

Save each month	Value*			
	In 1 year	In 5 years	In 9 years and 8 months	In 19 years and 8 months
$18.75	$225	$1,182	$2,456	$ 5,920
37.50	451	2,365	4,913	11,841
75.00	902	4,730	9,826	23,682

*Values include interest earned.

$600 to $1,200. For a married couple, both over 65, the exemption is $2,400. This lowers their taxable income and, in addition, may entitle them to a credit on interest income against any tax due up to $240; that is 20 per cent of $1,200. Since income from social security is tax exempt, it can readily be seen how a couple can enjoy quite a substantial income after 65 without paying any income tax.

The way E bonds are purchased for members of a family can also affect an income tax. The common way of purchasing E bonds for children, listing the parent and the child as co-owners, has a distinct tax disadvantage. The purchaser of a bond must pay tax on the interest even though the child (or someone else) is co-owner and ultimately gets the proceeds of the bond. This difficulty can be avoided by buying E bonds as a gift to the child, or to someone else, and having the bonds issued in his or her name only.

A minor child who has no other income can file a tax return and report annual bond interest up to $675 without paying any income tax. If the child had other income and the total exceeds $675, it may still pay to do this, since the child's tax bracket will be much lower than that of the parent.

If the child is over 19, is not a student, but it is wished to keep him or her as an exemption, then it would be better for him not to report the interest accrued on savings bonds each year if it lifts the child's income over $600. If the child is under 19, or is a full time student, and supported by his parents, they can still claim an exemption ($600) for him regardless of the amount of his income. The parents or guardians can figure out the more advantageous method.

Interest on H bonds, being current income, has to be reported for the year in which it is received. H bonds are tailor-made for investors who want guaranteed income with complete safety. The limit holding, as with E bonds, is $20,000 issued in any one calendar year. However, by having bonds issued in co-ownership—co-owners do not have to be relatives—the annual limit can be multiplied extensively.

As in the case of E bonds, the yield on H bonds held for 9 years and 8 months is 3 per cent per annum. Series E bonds can be held up to ten years after maturity, at which final point they are worth 80 per cent more than was paid for them originally.

As the Chinese proverb puts it: "The longest journey begins with one step." Expert investment counselors will point out that the most important thing about savings is regularity—start and stay with it. What seems a small weekly or monthly amount soon builds up into a surprising total as is illustrated in the table.

If the bond owner multiplies the amounts shown in the table to fit his own goals and savings potential, the totals will be approximately accurate.

The direct benefits of saving with savings bonds can be seen by looking at new homes, new cars, new household and other equipment for more comfortable living, at the college graduates and students, and at the couples who are living in or approaching retirement made more secure and comfortable by these savings. The financial emergencies that bond savings have met are no less real for not being visible.

COUNCIL ON LEGISLATION

A review of court decisions on fluoridation of public water supplies

The courts of ten states have held that the fluoridation of public water supplies does not infringe on the constitutional or legal rights of the individual and under appropriate state enabling authority is a proper exercise of the charter powers of local communities. These decisions were rendered by the courts of last resort in California, Louisiana, Ohio, Oklahoma, Oregon, Washington and Wisconsin and by trial courts in Maryland, Pennsylvania and North Dakota. These decisions are strengthened by the fact that the Supreme Court of the United States has refused to review four of these decisions for the stated reason that no substantial federal constitutional question was involved.

In marked contrast to the number of favorable holdings is the fact that only one court in this country has ever rendered an opinion adverse to fluoridation. In that one instance, a trial court in Louisiana rendered an adverse opinion which was reversed promptly by the Supreme Court of Louisiana, an action which the United States Supreme Court refused to review.

This unanimity of judicial opinion—an unusual fact in itself—gives the strongest support to the proposition that fluoridation satisfies every legal and constitutional criterion. Opponents of fluoridation have alleged that the procedure violated constitutional rights such as religious freedom and the right to privacy. They have argued that fluoridation represented the unlicensed practice of medicine, dentistry and pharmacy; that a community had no legal authority to adopt fluoridation procedures; that fluoridation was "mass medication" and a "poison"; that no reasonable relationship existed between it and the public health; and that the prevention of dental decay was not a proper object of community government efforts. To summarize, every conceivable legal and constitutional objection against fluoridation has been argued unsuccessfully in the ten cases that have been litigated on this subject. In the one case in which a trial court held against the fluoridation procedure, that decision was reversed by the state supreme court.

The major cases on the subject of fluoridation are listed below:

CALIFORNIA: *De Aryan v. the City of San Diego.* Appellate Court of California, 260 P.2d 98; U. S. Supreme Court refused to review, 74 S.Ct. 863.

LOUISIANA: *Chapman v. the City of Shreveport.* Supreme Court of Louisiana, 74 So.2d 142; U. S. Supreme Court refused to review, 75 S.Ct. 216.

OHIO: *Kraus v. the City of Cleveland.* Supreme Court of Ohio, 127 N.E.2d 609; U. S. Supreme Court refused to review, 76 S.Ct. 833. (See also decision of trial court, 116 N.E.2d 779.)

OKLAHOMA: *Dowell v. the City of Tulsa.* Supreme Court of Oklahoma, 273 P.2d 859; U. S. Supreme Court refused to review, 75 S.Ct. 292.

OREGON: *Baer v. the City of Bend.* Supreme Court of Oregon, 292 P.2d 134.

WASHINGTON: *Kaul v. the City of Chehalis.* Supreme Court of Washington, 277 P.2d 352.

WISCONSIN: *Froncek v. the City of Milwaukee.* Supreme Court of Wisconsin, 69 N.W.2d. 242.

MARYLAND: *Hoffman v. the City of Baltimore.* Circuit Court of Baltimore City. (Decision not reported and no appeal taken.)

PENNSYLVANIA: *Genkinger v. the City of New Castle Water Company.* Court of Common Pleas of Lawrence County. (Decision not reported and no appeal taken.)

NORTH DAKOTA: *McGurren v. the City of Fargo.* District Court. (Decision not reported and no appeal taken.) See, however, 66 N.W.2d 207.

INDIANA: *Teeter v. the City of La Porte.* To be scheduled for trial in the near future. See, however, decision of Indiana Supreme Court on procedural point reported in 139 N.E.2nd—, 236 Ind.—.

General discussions of the legal aspects of fluoridation may be found in the George Washington Law Review for January 1955, and in 43 ALR (2d) 453. Copies of most of the court decisions herein listed are available on request from the Council on Legislation.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies* and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Propoxycaine HCl (See A.D.R. ed. 22, p. 33), **Procaine HCl, U.S.P.** (See A.D.R. ed. 22, p. 25), **Nordefrin HCl** (See A.D.R. ed. 22, p. 95).

Ravocaine HCl 0.4%, Novocain 2% with Cobefrin 1:10,000 (Cook-Waite Laboratories, Inc.): Each cc. is stated to contain procaine HCl, 0.02 Gm.; propoxycaine HCl, 0.004 Gm.; nordefrin as HCl, 0.0001 Gm.; sodium chloride, 0.003 Gm.; acetone sodium bisulfite, not more than 0.002 Gm.; and water for injection. Marketed in 2.2 cc. minimum cartridges and in 300 cc. multiple dose vials. Hexylresorcinol 0.0001 Gm. is added to solution in multiple dose vials.

U. S. Trademarks: Ravocaine (propoxycaine), Novocain (procaine HCl), Cobefrin (nordefrin).

Propoxycaine HCl (See A.D.R. ed. 22, p. 33), **Procaine HCl, U.S.P.** (See A.D.R. ed. 22, p. 25), **Levarterenol Bitartrate, U.S.P.** (See A.D.R. ed. 22, p. 94).

Ravocaine HCl 0.4%, Novocain 2% with Levophed 1:30,000 (Cook-Waite Laboratories, Inc.): Each cc. is stated to contain procaine HCl, 0.02 Gm.; propoxycaine HCl, 0.004 Gm.; levarterenol as bitartrate monohydrate, 0.000033 Gm.; sodium chloride, 0.003 Gm.; acetone sodium bisulfite, not more than 0.002 Gm.; and water for injection. Marketed in 2.2 cc. minimum cartridges and in 30 cc. multiple dose vials. Hexylresorcinol 0.0001 Gm. is added to solution in multiple dose vials.

U. S. Trademarks: Ravocaine (propoxycaine), Novocain (procaine HCl), Levophed (levarterenol).

Procaine HCl, U.S.P. (See A.D.R. ed. 22, p. 25), **Epinephrine, U.S.P.** (See A.D.R. ed. 22, p. 93).

Procaine HCl 2%, Epinephrine 1:25,000 (Graham Chemical Corporation): (See A.D.R. ed. 22, p. 29) Manufactured for the following distributor:

Stratford-Cookson Company

Procaine HCl 2%, Epinephrine 1:50,000 (Graham Chemical Corporation): (See A.D.R. ed. 22, p. 29) Manufactured for the following distributor:

Stratford-Cookson Company

Procaine HCl, U.S.P. (See A.D.R. ed. 22, p. 25), **Phenylephrine HCl, U.S.P.** (See A.D.R. ed. 22, p. 95).

Procaine HCl 2%, Phenylephrine HCl 1:2,500 (Graham Chemical Corporation): (See A.D.R. ed. 22, p. 29) Manufactured for the following distributor:

Stratford-Cookson Company

Procaine HCl 4%, Phenylephrine HCl 1:2,500 (Graham Chemical Corporation): (See A.D.R. ed. 22, p. 29) Manufactured for the following distributors:

Lincoln Dental Supply Company
Stratford-Cookson Company

Procaine HCl 4%, Phenylephrine HCl 1:2,500 (Neo-Quest Chemical Co., Inc.): (See A.D.R. ed. 22, p. 31) Manufactured for the following distributor:

Lee Dental Supply

Mixtures of Cyclamate Salts and Saccharin (See A.D.R. ed. 22, p. 149-150).

Sucaryl Sodium Sweetening Solution* (Abbott Laboratories): Each 100 cc. of solution is stated to contain cyclamate sodium, 6 Gm., and saccharin sodium, 0.6 Gm., preserved with 0.1 Gm. benzoic acid and 0.05 Gm. methylparaben.

Sucaryl Sodium Tablets (Abbott Laboratories): Each tablet is stated to contain cyclamate sodium, 50 mg.; saccharin sodium, 5 mg.; soda ash, sodium citrate, tartaric acid, sodium benzoate and excipients.

Sucaryl Calcium Sweetening Powder (Abbott Laboratories): Stated to contain cyclamate calcium, 10 per cent, and saccharin calcium, 1 per cent, with acacia as diluent.

Sucaryl Calcium Sweetening Solution (Abbott Laboratories): Each 100 cc. of solution is stated to contain cyclamate calcium, 6 Gm., and saccharin calcium, 0.6 Gm., preserved with 0.1 Gm. benzoic acid and 0.05 Gm. methylparaben.

Sucaryl Calcium Tablets (Abbott Laboratories): Each tablet is stated to contain cyclamate calcium, 50 mg.; saccharin calcium, 5 mg.; citric acid, potassium carbonate and excipients.

*The brand name Sucaryl was formerly applied to the cyclamate compounds. It is now employed by Abbott Laboratories to designate their mixtures of saccharin and cyclamate salts.

Methylcellulose, U.S.P. (See A.D.R. ed. 22, p. 128).

Methyl Cellulose Solution 5% (King's Specialty Company): A solution containing methyl cellulose, 5 per cent, in distilled water with flavor and preservative added, for use as a diluent and suspending agent for calcium hydroxide in cavity lining, pulp capping, and pulpotomy.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

COUNCIL ON DENTAL RESEARCH

Supplement to list of certified dental materials

ADDITION • Since the publication of the most recent List of Certified Dental Materials, revised to December 1, 1956 (J.A.D.A. 54:130 Jan. 1957), the following materials which conform to American Dental Association Specification No. 1 for Dental Materials have been added.

CERTIFIED AMALGAM ALLOYS (A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or distributor*
Linc-Alloy	Lincoln Dental Supply Co.
New True Dentalloy	The S. S. White Dental Mfg. Co.
Silver Crown Fine Cut; Fine Cut Non-Zinc	General Refineries, Inc.
Twentieth Century Micro and Micro Non-Zinc (filings & pellets)	The L. D. Caulk Co.

COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS

Accreditation of dental laboratories

The recent controversy caused by the promulgation by the Federal Trade Commission of the *Trade Practice Rules for the Commercial Dental Laboratory Industry* has stimulated considerable interest in the development and maintenance of satisfactory relations between the dental profession and the commercial dental laboratory group. In November 1954 the Association's House of Delegates adopted the following statement of policy which emphasizes the importance of effective relations between profession and craft:

The American Dental Association reaffirms its position that properly planned constituent society programs for accrediting or approving dental laboratories, if given the wholehearted support of both dentists and dental laboratories, will prove to be the most practicable and effective device for improving the efficiency of dental laboratory services and for enhancing the profession's appreciation for, and confidence in, those dental laboratories which are continually striving to improve the quality and efficiency of their services to the profession. If successful, therefore, the program will serve to improve the quality and efficiency of the dentists' services to the public which is the primary aim of the American Dental Association and its constituent societies.

At the present time, nine constituent societies have adopted formal programs of accreditation for dental laboratories: Alabama; California; Southern California; Florida; Missouri; New Hampshire; North Carolina; Virginia; Wisconsin.

A number of other constituent societies are developing formal accreditation plans. In many states where formal accreditation programs have not yet been established, progress in establishing satisfactory relations between the dental profession and the dental laboratory group has been made. It is hoped that this progress will result in formal programs of accreditation in the near future.

The American Dental Association does not accredit dental laboratories. The Association has, however, established the following minimum requirements for accreditation which are intended to serve as guides to the constituent societies:

1. Evidence that the applicant dental laboratory's services are of reasonably high quality.
2. Evidence that the applicant dental laboratory's facilities and equipment are adequate to render in an efficient and satisfactory manner the types of services it offers to the profession.
3. Evidence that the dental appliances fabricated or processed by the applicant dental laboratory conform to the designs, directions, or instructions furnished by the dentists who order the appliances.
4. Evidence that the applicant dental laboratory observes all statutes and governmental regulations which bear upon its activities, including the prevailing standards of sanitation, health, labor and safety of the state and community in which it is located.
5. Evidence that the applicant dental laboratory provides services only to licensed dentists (or to other dental laboratories under appropriate circumstances).
6. Evidence that the advertisements of the applicant dental laboratory are directed to licensed dentists only (or to other dental laboratories under appropriate circumstances).
7. Evidence that the advertising matter sent or directed to the profession by the applicant dental laboratory is in keeping with the dignity of the relationship between the dental profession and the dental laboratory industry and craft.

The constituent society accreditation programs which have been established are administered through the cooperative efforts of the constituent society and the local laboratory association except in

North Carolina and Wisconsin. Also, except in North Carolina and Wisconsin, a requirement for the accreditation of a laboratory is membership in the constituent society of the National Association of Dental Laboratories. North Carolina reportedly revoked its mandatory membership requirement in deference to some laboratories which met every requirement for accreditation except membership in the laboratory association. Wisconsin administers its program on a district or component society basis; all ethical laboratories are eligible for membership. The differences in constituent society accreditation plans result partly from the need to conform with the varying requirements of state laws.

The Council will present the accreditation program recently adopted by the New Hampshire Dental Society in a forthcoming Council report.

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The film, "Mandibular Prognathism," reviewed in this article is only one of the newly acquired films available for rental ($2.50) from the Film Library, 222 E. Superior St., Chicago. For films and slides in endodontics, orthodontics, anesthesia, prosthodontics, periodontics, cleft palate habilitation, and oral pathology, consult the booklet, *Audio-Visual Materials in Dentistry* and the supplement.

FILM REVIEW

Mandibular Prognathism • 16 mm., color, sound, 45 minutes. Produced in 1955 by the Veterans Administration. The collaborators were: H. N. Brownson, D.D.S.; Robert L. Bennett, D.D.S.; A. B. McDonald, D.D.S.; Howard M. Farwell, D.D.S.; James B. Taylor, D.D.S., and Samuel Kaplan, M.D. Photography by Thomas Masterson, Medical Illustration Department of Long Beach Veterans Administration Hospital. Can be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

This film demonstrates a two-stage operation for the correction of mandibular prognathism. The film opens with a preoperative study of the patient, a 37 year old man. Front and profile views and intraoral photographs show the degree of prognathism. Roentgenograms supplement the study. The narrator uses a plaster model to demonstrate the steps to be followed in the operations. Drawings are used to review these steps.

The first stage of the surgical correction, the intraoral procedures, which put into application the previous explanations, are shown in detail. At the completion of the first stage, drawings review the procedures. An orthodontic appliance is used.

The second stage, the extraoral procedures, carried out six weeks later, are demonstrated in detail. Drawings are used to review the procedures at the completion of the operation. Postoperative studies which include "before and after" photographs, intraoral photographs and roentgenograms, follow. This film is well organized. The photography is good since the viewer can see clearly all the steps in the two-stage operation. The results appear satisfactory. The use of photographs, drawings and roentgenograms before and after each stage of the operation increases the film's instructional value. It shows the close cooperation of the dentist, physician and hospital personnel in a hospital background.

It is especially suitable for oral surgeons, hospital dental staffs and postgraduate students. Dental study clubs and dental societies may find it interesting program material.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

The 1956 survey of dental practice
V. Size of the dental office; insurance held by the dentist

Prior to the 1956 Survey of Dental Practice, two important questions relating to dental practice had not been investigated on a national scale: the size of dental offices and the types of insurance carried by dentists.

SIZE OF THE DENTAL OFFICE

In 1955, the average dental office had 610 square feet of floor space. There was considerable variation above and below the mean, however, as is shown in Table 25. About one out of every eight dentists had less than 300 square feet of office space, and a similar proportion had more than 1,000 square feet.

There were significant differences by state and region in the amount of office space reported (Table 26). Among the states from which a sufficient number of returns was received to allow presentation of averages, the two extremes were Illinois with an average of 480 square feet and Georgia with an average of 820 square feet. Other states where large offices were reported were Kansas (749 square feet) and Florida (747 square feet).

Regionally, largest offices were reported in the Southeast (716 square feet) and the Far West (685 square feet). Smallest offices were reported in the Central region (532 square feet). The ranking of regions with respect to size of office correlates positively with the ranking of regions with respect to number of auxiliary personnel employed (Table 22, Chapter IV).

Nationally, dentists paid an average rental of $2.19 per square foot of office space for the year 1955 (Table 26). Regionally, highest rent per square foot was paid in the Far West ($2.51) followed by the Middle East ($2.38). Dentists in the Northwest ($1.71) and the Southeast ($1.76) reported the lowest average rent per square foot.

In some instances the rent per square foot was substantially different for states within the same region and even for adjacent states. Dentists in Illinois reported paying $2.55 per square foot compared with $1.64 for Iowa dentists and $1.70 for Indiana dentists.

It will be noted that multiplying the mean rent per square foot by the mean number of square feet of office space indicates an average rental somewhat higher than the figure reported in Chapter IV. This results from the fact that dentists not answering the question on

Table 25 • Percentage distribution of independent dentists according to square feet of office space, 1955

Square feet of office space	Per cent of dentists	Cumulative per cent
— 199	3.2	3.2
200— 299	8.7	11.9
300— 399	14.2	26.1
400— 499	18.0	44.1
500— 599	14.2	58.3
600— 699	12.8	71.1
700— 799	7.7	78.8
800— 899	6.5	85.3
900—1,049	7.1	92.4
1,050—1,249	3.2	95.6
1,250—2,249	3.0	98.6
2,250—	1.4	100.0

The first, second, third and fourth articles of this series appeared in The Journal for November and December 1956, January and February 1957.

Table 26 • Mean square feet of office space of independent dentists and mean rent per square foot, by region and state, 1955

Region and state	Mean square feet	Rent per square foot
NEW ENGLAND	581	$2.02
Connecticut	553	2.23
Maine	*	*
Massachusetts	561	2.20
New Hampshire	*	*
Rhode Island	*	*
Vermont	*	*
MIDDLE EAST	594	2.38
Delaware	*	*
District of Columbia	*	*
Maryland	572	2.55
New Jersey	607	2.29
New York	606	2.53
Pennsylvania	547	1.98
West Virginia	*	*
SOUTHEAST	716	1.76
Alabama	*	*
Arkansas	*	*
Florida	747	2.08
Georgia	820	1.73
Kentucky	648	1.62
Louisiana	*	*
Mississippi	*	*
North Carolina	645	1.64
South Carolina	*	*
Tennessee	649	1.99
Virginia	656	1.81
SOUTHWEST	668	2.24
Arizona	*	*
New Mexico	*	*
Oklahoma	626	2.12
Texas	671	2.24
CENTRAL	532	2.21
Illinois	480	2.55
Indiana	627	1.70
Iowa	559	1.64
Michigan	562	2.53
Minnesota	507	2.00
Missouri	509	2.24
Ohio	597	2.04
Wisconsin	489	2.14
NORTHWEST	598	1.71
Colorado	515	2.34
Idaho	*	*
Kansas	749	1.56
Montana	*	*
Nebraska	674	1.42
North Dakota	*	*
South Dakota	*	*
Utah	*	*
Wyoming	*	*
FAR WEST	685	2.51
California	698	2.70
Nevada	*	*
Oregon	614	2.14
Washington	684	1.90
UNITED STATES	610	$2.19

*Too few replies for reliable statistics.

amount of office space tended to have lower than average rent per square foot or smaller than average offices.

The average number of square feet of office space by number of dental chairs and by region is shown in Table 27. Roughly 200 square feet of office space was added for each additional chair.

INSURANCE HELD BY THE DENTIST

Six types of insurance were listed on the questionnaire, and the dentist was asked to check the types he owned. As shown in Table 28, ownership of life insurance was reported by 98.0 per cent of the independent dentists responding; malpractice insurance, 94.1 per cent; accident and sickness (disability) insurance, 84.1 per cent; hospitalization or medical insurance, 75.3 per cent; dental equipment floater insurance, 71.2 per cent, and workmen's compensation and employer's liability insurance, 35.4 per cent.

Among the 32 individual states with enough responses for reliable statistics, the ownership of accident and sickness (disability) insurance varied from a high of 94.0 per cent in Connecticut to a low of 73.1 per cent in Colorado. Regionally, ownership of accident and sickness insurance was highest in New England (91.1 per cent) and lowest in the Northwest (80.5 per cent). Nebraska (88.6 per cent) was an exception to the rule in the Northwest.

The percentage of nonsalaried dentists holding accident and sickness insurance varied significantly by age group (Table 29). Only 68 per cent of dentists under 30 reported ownership of this type of insurance. The proportion increased gradually reaching a high of about 90 per cent among dentists 55 through 64 years old. Beyond age 64 the percentage declined.

A slightly larger proportion of specialists (85.6 per cent) than of general practitioners (83.9 per cent) reported having accident and sickness insurance (Table 30).

As shown in Table 28, there were substantial state-to-state and region-to-region differences in the proportion of independent dentists with hospitalization or medical insurance (payment of medical or hospital expenses, such as under Blue Cross or Blue Shield). The percentage was high in New England (88.9 per cent) and the Middle East (81.9 per cent), average in the Central region (78.3 per cent), and relatively low in the Southeast (65.7 per cent), Southwest (66.5 per cent), (Northwest 65.9 per cent) and Far West (68.9 per cent).

Ownership of hospitalization or medical insurance was relatively low among the very old and the very young dentists (Table 29). Between these extremes, there was no distinct trend in ownership of hospitalization or medical insurance by age.

A significantly greater proportion of specialists (80.7 per cent) than of general practitioners (74.9 per cent) held hospitalization or medical insurance (Table 30).

More than 85 per cent of the independent dentists reported having malpractice insurance in all of the 32 "reliable statistics" states except Nebraska, where the figure was only 72.9 per cent (Table 28). The highest percentage was in Connecticut (99.0 per cent).

About 97 per cent of all dentists under 45 years of age reported having malpractice insurance (Table 29). There was a steady decline in ownership of malpractice insurance with age after 45.

A slightly higher percentage of the oral surgeons, orthodontists and pedodontists than of the general practitioners had malpractice insurance (Table 30).

The survey revealed a very great disparity in the proportion of independent dentists covered by workmen's compensation and employer's liability insurance in the various states and regions (Table 28). A much larger proportion of the dentists in the Far West (72.2 per cent) reported having this type of insurance than in any other region. Ranking second was the Middle East (44.1 per cent), followed by the Northwest (29.2 per cent); Central (25.6 per cent); New England (20.0 per cent); Southeast (16.8 per cent), and the Southwest (12.3 per cent). Among the 32 separately reported states, California was high with 84.4 per cent and North Carolina low with 1.6 per cent.

Table 27 • Mean square feet of office space o independent dentists according to number of chairs in 1955, by region

Region	One chair	Two chairs	Three chairs	Four chairs
New England	470	583	864	*
Middle East	484	646	904	*
Southeast	463	681	935	*
Southwest	460	677	883	*
Central	386	607	749	*
Northwest	451	610	*	*
Far West	548	632	896	*
United States	451	634	878	1,039

*Too few replies for reliable statistics.

Ownership of workmen's compensation and employer's liability insurance also varied much according to type of practice (Table 30). This type of insurance was owned by 34.0 per cent of the general practitioners compared with 52.3 per cent of the specialists. Among the specialists, the percentage was considerably higher for pedodontists (75.6 per cent) and oral surgeons (60.8 per cent) than for orthodontists (47.3 per cent).

Ownership of dental equipment floater insurance was reported by 71.2 per cent of the independent dentists and this figure did not vary much with state, age or type of practice. There was a decline with advancing age in the percentage of dentists having this type of insurance, but the decline was not sharp until after age 65 (Table 29). A somewhat larger proportion of pedodontists (85.3 per cent) carried dental equipment floater insurance than of dentists engaged in other types of practice (Table 30).

Ninety-eight per cent of the independ-

Table 28 • Percentage of independent dentists carrying specified types of insurance, by region and state

Region and state	Life insurance	Accident and sickness	Hospital or medical insurance	Malpractice insurance	Workmen's comp. and employer's liability	Dental equipment floater insurance
NEW ENGLAND	96.9	91.1	88.9	96.3	20.0	77.2
Connecticut	98.0	94.0	94.0	99.0	23.2	76.8
Maine	*	*	*	*	*	*
Massachusetts	94.8	91.3	90.0	94.9	20.7	75.0
New Hampshire	*	*	*	*	*	*
Rhode Island	*	*	*	*	*	*
Vermont	*	*	*	*	*	*
MIDDLE EAST	97.7	82.0	81.9	94.3	44.1	71.1
Delaware	*	*	*	*	*	*
District of Columbia	*	*	*	*	*	*
Maryland	100.0	87.3	73.0	93.7	31.7	77.8
New Jersey	99.3	77.1	81.7	96.7	56.2	72.5
New York	96.3	80.0	84.1	93.4	40.4	70.4
Pennsylvania	99.7	87.0	82.2	95.5	51.7	71.9
West Virginia	100.0	86.7	60.0	88.9	6.7	64.4
SOUTHEAST	99.4	82.5	65.7	90.1	16.8	70.9
Alabama	100.0	75.5	65.3	85.7	6.1	69.4
Arkansas	*	*	*	*	*	*
Florida	98.2	91.9	70.3	91.9	27.0	61.3
Georgia	100.0	80.0	52.0	90.0	16.0	78.0
Kentucky	98.7	76.0	61.3	94.7	12.0	73.3
Louisiana	100.0	75.5	69.4	87.8	22.5	65.3
Mississippi	*	*	*	*	*	*
North Carolina	100.0	85.2	57.3	88.5	1.6	67.2
South Carolina	*	*	*	*	*	*
Tennessee	98.6	75.3	72.6	86.3	13.7	76.7
Virginia	100.0	87.7	75.3	94.5	23.3	72.6
SOUTHWEST	99.4	81.0	66.5	91.3	12.3	67.4
Arizona	*	*	*	*	*	*
New Mexico	*	*	*	*	*	*
Oklahoma	100.0	79.3	63.7	93.1	8.6	75.8
Texas	99.5	79.8	68.3	89.9	12.5	63.5
CENTRAL	98.2	85.0	78.3	95.7	25.6	70.4
Illinois	98.9	81.0	72.8	95.3	23.6	68.4
Indiana	98.0	84.2	78.2	97.0	49.5	70.3
Iowa	99.0	85.4	73.7	94.1	18.4	74.7
Michigan	97.9	85.2	82.8	97.1	20.5	70.5
Minnesota	98.8	86.0	72.0	97.0	64.0	70.7
Missouri	96.5	85.1	80.9	88.7	14.8	64.3
Ohio	98.8	89.0	85.3	97.1	13.5	73.1
Wisconsin	96.3	87.1	81.0	96.3	14.7	72.4
NORTHWEST	98.6	80.5	65.9	87.8	29.2	71.9
Colorado	95.5	73.1	65.7	91.0	11.9	62.7
Idaho	*	*	*	*	*	*
Kansas	98.6	80.8	71.2	93.1	9.6	74.0
Montana	*	*	*	*	*	*
Nebraska	100.0	88.6	75.7	72.9	31.4	77.1
North Dakota	*	*	*	*	*	*
South Dakota	*	*	*	*	*	*
Utah	100.0	73.8	66.7	90.5	35.7	61.9
Wyoming	*	*	*	*	*	*
FAR WEST	97.0	86.5	68.9	97.1	72.2	71.5
California	96.7	88.3	73.4	97.8	84.4	74.6
Nevada	*	*	*	*	*	*
Oregon	100.0	80.4	54.6	95.9	41.2	60.8
Washington	96.6	82.2	58.5	95.8	39.0	65.2
UNITED STATES	98.0	84.1	75.3	94.1	35.4	71.2

*Too few replies for reliable statistics.

Table 29 • Percentage of independent dentists carrying specified types of insurance, by age

Age	Life insurance	Accident and sickness	Hospital or medical insurance	Malpractice insurance	Workmen's comp. and employer's liability	Dental equipment floater insurance
25—29	98.6	68.0	67.3	97.3	24.5	75.5
30—34	98.8	77.6	73.7	97.0	34.7	78.4
35—39	99.3	84.1	76.2	97.8	38.8	78.1
40—44	99.2	85.8	80.4	97.1	41.6	77.7
45—49	99.1	86.6	76.9	93.7	37.9	69.3
50—54	99.2	88.3	73.4	93.6	37.5	66.0
55—59	97.6	90.8	76.2	90.2	33.8	63.6
60—64	95.1	90.1	75.8	89.8	31.2	61.7
65—69	92.3	87.9	78.1	85.2	24.0	54.6
70—74	88.2	71.4	62.3	76.5	18.8	41.2
75—	86.8	58.8	58.8	70.6	13.2	44.1
All ages	98.0	84.1	75.3	94.1	35.4	71.2

ent dentists responding indicated they carried life insurance (Table 28). In several states, the figure was 100 per cent.

Life insurance ownership by age shows a definite pattern (Table 29). Approximately 99 per cent of independent dentists under age 55 reported having life insurance. Beyond that age, the percentage decreased with each higher age group, reaching a low of 86.8 per cent among dentists 75 years of age and older. When these dentists graduated, some 50 years ago, ownership of life insurance was not nearly so popular as it is today. By the time life insurance came to be considered a necessity, undoubtedly many of the dentists now in the upper age brackets had become physically disqualified for life insurance.

The average amounts of life insurance carried by dentists, according to state, region, age and type of practice, are shown in Tables 31, 32 and 33. The mean amount of life insurance carried by all dentists was about $36,000, whereas the figure for salaried dentists was about $28,000.

These averages include dentists who reported they had no life insurance. The mean amount of life insurance for independent dentists having life insurance may be obtained by dividing the amount

Table 30 • Percentage of independent dentists carrying specified types of insurance, by type of practice

Type of practice	Life insurance	Accident and sickness	Hospital or medical insurance	Malpractice insurance	Workmen's comp. and employer's liability	Dental equipment floater insurance
General practitioner	98.1	83.9	74.9	94.0	34.0	71.0
Specialist	97.8	85.6	80.7	95.6	52.3	73.6
Oral surgeon	98.4	86.4	84.8	97.6	60.8	70.4
Orthodontist	98.8	88.6	80.8	98.8	47.3	73.1
Pedodontist	97.6	80.5	78.0	97.6	75.6	85.3
Periodontist	*	*	*	*	*	*
Prosthodontist	*	*	*	*	*	*
All types	98.0	84.1	75.3	94.1	35.4	71.2

*Too few replies for reliable statistics.

Table 31 • Average amount of life insurance carried by dentists, by region and state

Region and state	All dentists		Independent dentists		Salaried dentists	
	Mean	Median	Mean	Median	Mean	Median
NEW ENGLAND	$35,947	$30,000	$35,522	$30,000	$ *	$ *
Connecticut	37,707	34,000	36,398	34,000	*	*
Maine	*	*	*	*	*	*
Massachusetts	33,004	30,000	32,857	30,000	*	*
New Hampshire	*	*	*	*	*	*
Rhode Island	*	*	*	*	*	*
Vermont	*	*	*	*	*	*
MIDDLE EAST	34,338	29,000	34,728	30,000	26,442	19,000
Delaware	*	*	*	*	*	*
Dist. of Columbia	36,190	30,000	*	*	*	*
Maryland	43,910	42,000	45,019	45,000	*	*
New Jersey	33,861	30,000	34,479	30,000	*	*
New York	33,166	26,000	34,106	28,000	*	*
Pennsylvania	34,525	26,000	33,521	25,000	*	*
West Virginia	36,732	32,000	*	*	*	*
SOUTHEAST	40,248	33,000	41,114	35,000	28,195	23,000
Alabama	36,232	33,000	37,093	35,000	*	*
Arkansas	*	*	*	*	*	*
Florida	46,137	40,000	46,410	40,000	*	*
Georgia	54,833	45,000	54,065	40,000	*	*
Kentucky	32,300	26,000	31,746	25,000	*	*
Louisiana	39,061	32,000	41,791	33,000	*	*
Mississippi	*	*	*	*	*	*
North Carolina	43,869	37,000	43,809	37,000	*	*
South Carolina	*	*	*	*	*	*
Tennessee	37,796	30,000	41,331	30,000	*	*
Virginia	36,911	32,000	38,192	35,000	*	*
SOUTHWEST	36,623	30,000	37,261	30,000	*	*
Arizona	*	*	*	*	*	*
New Mexico	*	*	*	*	*	*
Oklahoma	38,071	30,000	37,556	30,000	*	*
Texas	36,645	30,000	37,229	30,000	*	*
CENTRAL	34,730	30,000	35,041	30,000	26,228	22,000
Illinois	31,584	25,000	31,949	25,000	*	*
Indiana	41,188	34,000	41,861	35,000	*	*
Iowa	34,396	28,000	36,096	30,000	*	*
Michigan	36,098	30,000	36,278	32,000	*	*
Minnesota	31,314	30,000	31,535	30,000	*	*
Missouri	29,691	25,000	29,801	25,000	*	*
Ohio	38,431	33,000	38,583	32,000	*	*
Wisconsin	36,682	30,000	36,183	30,000	*	*
NORTHWEST	32,632	28,000	32,817	29,000	*	*
Colorado	36,796	30,000	35,962	30,000	*	*
Idaho	*	*	*	*	*	*
Kansas	33,221	25,000	33,938	28,000	*	*
Montana	*	*	*	*	*	*
Nebraska	31,210	27,000	31,484	27,000	*	*
North Dakota	*	*	*	*	*	*
South Dakota	*	*	*	*	*	*
Utah	31,244	28,000	31,402	28,000	*	*
Wyoming	*	*	*	*	*	*
FAR WEST	39,381	30,000	39,960	31,000	30,441	20,142
California	41,314	32,000	42,781	35,000	*	*
Nevada	*	*	*	*	*	*
Oregon	35,684	30,000	35,044	30,000	*	*
Washington	32,445	25,000	29,995	23,000	*	*
UNITED STATES	$36,057	$30,000	$36,434	$30,000	$27,921	$20,000

*Too few replies for reliable statistics.

Table 32 • Average amount of life insurance carried by dentists, by age

Age	All dentists		Independent dentists		Salaried dentists	
	Mean	Median	Mean	Median	Mean	Median
25—29	$29,369	$25,000	$31,419	$25,000	$26,674	$20,000
30—34	40,934	35,000	41,936	35,000	30,703	20,000
35—39	43,044	37,000	43,849	40,000	28,224	25,000
40—44	42,598	37,000	44,304	40,000		
45—49	36,627	30,000	36,805	30,000	*	*
50—54	32,326	25,000	32,000	25,000	*	*
55—59	26,093	23,000	25,762	23,000	*	*
60—64	23,720	18,000	23,521	18,000	*	*
65—69	21,450	16,000	20,919	16,000	*	*
70—74	15,664	10,000	15,258	10,000	*	*
75—	11,480	5,000	11,851	5,000	*	*
All ages	$36,057	$30,000	$36,434	$30,000	$27,921	$20,000

*Too few replies for reliable statistics.

Table 33 • Average amount of life insurance carried by dentists, by type of practice

Type of practice	All dentists		Independent dentists		Salaried dentists	
	Mean	Median	Mean	Median	Mean	Median
General practitioner	$34,859	$30,000	$35,040	$30,000	$27,368	$20,000
Specialist	47,234	40,000	52,527	45,000	29,527	25,000
Oral surgeon	50,400	40,000	54,414	40,000	*	*
Orthodontist	58,082	50,000	59,126	50,000	*	*
Pedodontist	42,768	35,000	49,472	41,000	*	*
Periodontist	42,638	40,000	*	*	*	*
Prosthodontist	30,986	18,000	*	*	*	*
All types	$36,057	$30,000	$36,434	$30,000	$27,921	$20,000

*Too few replies for reliable statistics.

of life insurance as shown in Tables 31, 32 and 33 by the percentage of independent dentists having life insurance as shown in Tables 28, 29 and 30, and moving the decimal point of the quotient two places to the right. Thus, for all independent dentists: 36,434÷98.0=371.78. The mean amount of life insurance held by those independent dentists having life insurance was $37,178.

The mean amount of life insurance held did not vary greatly by region and state, the two regional extremes being the Southeast ($40,248) and the Northwest ($32,632) (Table 31). High states were Georgia ($54,833) and Florida ($46,137).

The amount of life insurance carried by dentists increased with age through age 39, when a decline set in—gradual during middle age but abrupt in the upper age groups, reaching a low of $11,480 (mean) among dentists 75 and older (Table 32). Indeed, the median in the top age bracket was only $5,000.

The mean amount of life insurance held by specialists ($47,234) was considerably higher than the amount held by general practitioners ($34,859) (Table 33). Among the specialists, orthodontists owned the most life insurance ($58,082).

The next article in this series will present information on the number of hours, days and weeks worked by the dentist.

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Editorials

No funds for Institute of Dental Research building: penny-wise and pound-foolish

According to the mid-January newspaper dispatches, Secretary of the Treasury Humphreys is concerned over the seventy-two billion dollar federal budget proposed for the fiscal year 1958. His concern is not surprising. It is shared, probably, by most of his fellow Americans—especially by those who pay the bills. Certainly it is shared by most members of the dental profession—not only because of what has been written into the budget but because of what has been written out: specifically, the four million dollars designed to finance a building for the Institute of Dental Research, an expenditure approved by Congress last year.

The seventy-two billion dollar budget is the largest peacetime budget ever requested in the history of the nation. It is only 1 per cent below the Korean War budget of 1953. By far the largest item of expenditure in the proposed 1958 budget—forty-three billion dollars—goes for national defense, and some seven billion dollars goes for interest on the national debt. Toilers in the fields of health cannot help but speculate on the improvements in living standards that could be made if those fifty billion dollars could be directed toward the extermination of pestilence and poverty rather than toward the extermination of man.

As it is, allocations for the Department of Health, Education, and Welfare for fiscal 1958 are slightly more than three billion dollars, a small fraction indeed of the seventy-two billion dollar budget. Those interested in public health, however, cannot complain too greatly, as the Department of Health, Education, and Welfare will

receive about 23 per cent more funds than in 1957, an increase accounted for by larger appropriations for the Food and Drug Administration, chronic disease, geriatrics, air and water pollution and health services for American Indians.

Grants for dental health activities are increased less than 7 per cent—from $6,026,000 to $6,430,000. In view of the sizable increase in federal appropriations for dental research and other dental activities in fiscal 1957, the modest increase in the 1958 budget was not unexpected. What was unexpected was the deletion of the four million dollar item for the construction of a building to house the Institute of Dental Research, the space and facilities of which are urgently needed.

On two past occasions Congress has approved the structure and on two occasions funds have been appropriated to finance its planning—one hundred thousand dollars in 1949 and two hundred thousand dollars in 1956. The fact that nearly a third of a million dollars is tied up in preliminary planning provides another strong argument in favor of the early completion of the building.

Those interested in raising the standards of dental health in America—those who know the needs and who can foresee the benefits of such a building—should use their influence to bring to fruition a national health project for which dentistry has labored so long and urged so earnestly.

Dental toiletries: their use and limitations

Twenty-eight million dollars worth of dentifrices was involved in a patent infringement lawsuit recently settled in the United States Court of Appeals.[1] Twenty-eight million dollars of dentifrices, the therapeutic claims for which have never been proved to the satisfaction of most dental researchers. The publicity produced by the litigation, however, has rekindled in the minds of the profession a subject of perennial interest. It is the subject of dentifrices. It is the superlative claims made for many of them. It is the effect which such claims have on every preventive dental program in the country and on the profession's efforts to raise the standards of dental health in America.

Although few dentists are interested in litigation involving an ancillary mouth hygiene product, most are interested in the fact that a gullible public has been motivated to purchase some twenty-eight million dollars[2] worth of a commodity the therapeutic claims for which are highly disputable. In this respect, however, the promoters of the product are no better nor worse than many of their competitors. All go the legal limit in their use of the superlative. The manufacturers of the dentifrice in question base their claims of superiority on its di-ammonium phosphate content. Other manufacturers build their promotion on the action of other ingredients—detergents, chlorophyll, antienzyme and fluorides—all of which have got no farther off the ground—anticariogenically speaking—than a lead balloon.

Although dentistry has no desire to see competition between dentifrice manufacturers develop to a degree that it results in litigation, the profession is not reluctant

to see such competition stimulate more and better research which eventually may result in a dentifrice that will perform the miracles claimed for those in the market today. In the meantime, copywriters should word their claims of superiority with sufficient restraint so as to motivate more people to brush their teeth without giving them a false sense of security in the brushing.

During 1953 to 1955 inclusive, the American public spent approximately three quarters of a billion dollars[3] for oral hygiene products—dentifrices, tooth brushes, dental floss, mouthwashes and denture cleansers. Three quarters of a billion dollars in three short years is a sizable contribution to the nation's dental health program, one capable of much good provided the purchasers of the products do not put full reliance on the therapeutic claims made for them. Dentistry has the twofold task of stimulating the increased use of dental toiletries and of educating the public to a full understanding of their limitations.

1. United States Court of Appeals 2872 The Schiffer Press, Inc., Chicago 1-16-27-100.
2. Chicago Daily Tribune, Jan. 17, 1957.
3. Drug Topics, August 8, 1956.

General practice: the foundation of dentistry

The action of the House of Delegates last fall disfavoring the further fractionalization of dentistry through the establishment of additional specialties brings into sharp relief the differences of opinion held by dentists on the subject. It is understandable that, as dentistry progresses, certain members become interested in a particular facet of practice. It is understandable that those with common interests should join together for common benefit and that this in turn should lead to specialization and to an honest desire for recognition of the specialty.

How far specialization should go, what effect it may have on the over-all practice of dentistry, and particularly what effect it may have on the status of general practice, are matters of concern to everyone interested in the growth and development of the profession.

Certainly, no one questions a practitioner's efforts to improve his education and training. Nor would one question the efforts of a group of dentists in that direction. On the other hand, specialization carried to the nth degree could bring ruination to general practice, a situation to be deplored. The general practitioner is and always will be the backbone of dental practice.

Since 1954 the Council on Dental Education has maintained a moratorium on further applications from groups seeking formal recognition as a dental specialty, until more extended study of the problem of classifying the dental specialty groups can be completed. In its 1955 report, the Council, noting that applications for formal recognition had come from six additional groups of "specialists," observed that "recognition of all these would lead to an oversegmentation of dental practice and . . . this would defeat the purpose of specialization both from the viewpoint of the profession and also insofar as its function of providing service to the public is concerned."

The Council hastened to assure the profession, however, that at all times "it is anxious to encourage advanced study in all branches of dentistry."

A development of great potential value in stimulating the general practitioner to keep up with technical developments in his profession has been the formation, in recent years, of study groups of general practitioners.

One such group, the Academy of General Dentistry, was founded in Chicago in 1953 to emphasize the responsibility of the dentist to continue his training after graduation. Today the Academy has members in more than a score of states and in several countries in Europe and Asia. The organization has urged dental schools to make the cost of postgraduate study nominal, and the time of presentation of the courses convenient.

Over a year ago the California Academy of General Practice was organized with one hundred charter members, to stress the importance of general dentistry and to encourage study. This group requires its members to take at least fifty hours of postgraduate work annually. Today the organization numbers one hundred and fifty.

The concern for the general practitioner is well expressed by the credo of the Institute for Continuing Dental Education of the Dental Society of the State of New York. That credo reads in part as follows:

> A general practitioner is the symbol of dentistry—past, present and future. He is the standard bearer upon whom dentistry places its hopes. . . . In his hands lies the destiny of dentistry as a profession, as well as the oral health of the nation.
>
> It is he who feels the pulse beat of the dental patient and who answers to the public for dentistry's failures and successes. . . . A general practitioner is responsible to himself and to society to keep abreast of the changing scientific scene. He must familiarize himself with new drugs, new technics and dentistry's social and economic relationship to society. He must be aware of legislation affecting his welfare as a dentist and dentistry's welfare as a profession.
>
> It is his obligation to participate in public health affairs, in civil defense and in the care of the indigent. It is his duty to abide by the rules and code of ethics of his dental society and the dental practice act of his state. Above all, he must realize that he has been granted a license to practice by the people and it is to them that he must account in the final analysis.
>
> In short, the general practitioner is dentistry. He can continue to do credit to his profession only by keeping pace with the changing times and by stubbornly abiding by the moral principles established by his predecessors.

General practice is the foundation on which the various specialties of dentistry are built. No effort must be spared to make that foundation stronger and sturdier in order to sustain the entire structure of dentistry.

International Correspondence

NEWS FROM GREAT BRITAIN

The heartfelt sympathy of friends and colleagues both at home and abroad will go to the president of the British Dental Association, Mr. R. J. Hooker, whose wife died suddenly at Christmas time.

First details of the 1957 annual conference of the Association are published in the current issue of the *British Dental Journal*. The meeting will take place in Newcastle on Tyne July 1-5 when Harry Davis, F.D.S., R.C.S., a well-known practitioner of Newcastle will be elected president.

"A year of useful work' is the heading of the editorial in the *British Dental Journal* of January 1, which comments on the activities of the Association in the past year. It points out that a large amount of useful work has been accomplished, mostly by the members themselves and concludes that the Association has had a year of success even if some important objectives have not been attained. Some of the important events during the year include the following.

The Dentists' Act of 1956. This measure, which has brought autonomy to the profession, was a milestone in the progress of dentistry, and, as a result of the efforts of the Association, the measure was much more acceptable to the profession than it otherwise would have been.

Report of McNair Committee. The publication of the report on dental recruitment was a result of the Association's initiative in having this committee set up.

The General Dental Services. The Association continued its work of securing adjustments in the regulations to benefit practitioners who provide the general dental services. A revised scale of fees becomes effective about March 1.

The Hospital Service. For dental officers in the hospital consultant service, the past year has been valuable chiefly for the strengthening of the unity with their medical colleagues.

The Public Health Service. Much has been done to improve the lot of those members of the profession engaged in the health service administered by local health education authorities.

Dental Officers in the Armed Forces. These men now enjoy the same rates of pay at the beginning and end of their career as their medical colleagues.

Dental Health. This year has seen the establishment of the dental health committee under the chairmanship of Gerald Leatherman. Three subcommittees now exist—child dental health, under the chairmanship of Philip Capon; dental health education, led by Stewart Ross, and dental research, guided by Geoffrey Slack.

The Library. The Association has one of the best dental libraries in the world, for which great thanks are due to the librarian, Lilian Lindsay. From its stock of 12,000 volumes of books and periodicals, over 5,000 are borrowed each year, and most are sent post free to members in the British Isles and in overseas forces.

GENERAL DENTAL COUNCIL

The General Dental Council held its third session November 1956, and the president, Sir Wilfred Fish, reviewed the McNair Report as it affects the Council. The Council has informed the Minister of Health of its approval of the recommendations regarding dental health education contained in the report.

Edward Sampson, chairman of the dental health education committee of the General Dental Council, in his article called "Lo All Our Pomp of Yesterday," *(British Dental Journal*, January 1) introduces some vital figures and controversial thoughts. He writes:

" 'The British have the worst teeth in the world.' So wrote Dr. Harry Campbell as far back as 1936. Though the depressing fact of our oral frightfulness was known to dentists long before then, as well as being on official record, no improvement is obvious today, and this despite the fact that a National Health Service provides £38,000,000 annually to repairing and replacing the nation's dental wreckage, and, if you share the popular awe of immense figures, £258,356,000 since July 1948. Perhaps it is because our people can draw so easily upon state funds to remedy their neglect that their teeth are not more valued. If no dentures were available, if extraction for relief of pain in uncared-for teeth were expensive, Nature's teeth might be better cared for.

"This cannot entirely account for British stupidity and apparent ignorance of rudimentary dental hygiene, for there is something inherent in the character of our otherwise reasonable people which has always led them to regard dentistry as a macabre joke, teeth

as readily expendable. 'The British have the worst teeth in the world,' but the British don't care.

"Sociologists and psychologists could probably provide some plausible explanation of this paradox in our natures, this contradiction in behaviour which causes us to worship good sanitation, to make a fetish of the daily bath, yet permits us to have mouths disgusting to savages. A strange people indeed!"

Dr. Sampson believes that the remedy lies in education, "in persuading people to service their teeth as regularly as they service their cars." He points out that while a few thousand pounds are spent each year on education, the provision of dentures costs no less than millions in the State service alone.

"In a truly ideal state," he writes, "not one working to the economic ideal of the welfare state—everyone would possess sound teeth in a healthy mouth, produced by correct diet and wise living. Such a biological paradise, like every other reformer's dream, would necessitate planning, involve prohibitions, with limitations of personal freedom. . . . Adulterated white bread would be banned, wholemeal bread enforced. . . . a diet partially composed of fresh vegetables made compulsory. Sale of sweets, with all other harmful foods, would be a serious offence; indeed, to provide anything but 'natural' diet would, in a dental Utopia, carry heavy penalties. Thus and only thus, might a government eliminate dental disease—and with it all individual liberty."

Dr. Sampson does not favor such measures, but he thinks it not unreasonable to ask a government which spends £38,000,000 a year on restorative dentistry to spend a far lesser sum on education in order to reduce the need for care. That is simple economics, he says.

He deplores the shortage of right-minded dentists who are willing to preach and practice prophylactic dentistry. "While there are men who are too impatient or too tired to conserve first teeth, who tell mothers these are of no importance; while there are those who are seduced from conservation dentistry by easy exodontia and profitable prosthesis, dental health education will fall far short of its maximum usefulness."

Dentists must educate their patients for "in the ultimate issue it is the man at the chair-side who is the educator. By providing proper instruction with visionary treatment, he alone can create dental fitness, which means a functionally perfect mouth. Though inspired propaganda can create the demand for preventive dentistry, it will prove abortive if too few dentists are prepared to supply it."

ITEMS OF INTEREST

The congratulations of the dental profession in the United Kingdom have been wholeheartedly given to Miss Gillian Sheen, L.D.S., B.D.S., who received a gold medal for winning the women's individual foil competition at the 1956 Olympic Games in Melbourne, and to Miss Thelma Hopkins, a second year dental student at Queen's University, Belfast, who was second in the women's high jumping competition and received a silver medal.

Cambridge University has conferred on Mrs. Shirley Hughes the degree of Ph.D. for her thesis "The Embryology of Tooth Germs." This is a fitting recognition of the splendid research work that Mrs. Hughes has been carrying out for many years.

The many friends and colleagues both in Great Britain and abroad will wish to congratulate Prof. H. Humphries on being made a Commander of the British Empire.

The American Dental Society of London held its monthly meeting in January at the Royal College of Surgeons, when a most interesting paper was presented by Mr. A. V. Everett on problems in complete denture construction.

The International Association for Dental Research, British division, is holding its fifth meeting April 11 and 12 at Eastman Dental Hospital, London.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

Association Affairs

FOUR CHANGES NEEDED IN FTC CODE, A.D.A. TESTIFIES

Four changes are needed in the Federal Trade Commission's *Rules for the Commercial Dental Laboratory Industry,* the American Dental Association testified February 4.

Association representatives appeared at a day-long public hearing conducted in Chicago by the Federal Trade Commission. The hearing was requested by the A.D.A. Nearly 200 people filled the ballroom of the Knickerbocker Hotel to watch the proceedings.

During the day, 17 witnesses appeared before FTC Commissioner Robert T. Secrest; Mr. Paul Cameron, chief of the Trade Practices Conference Division, and David Stauffer, attorney of the Division. The witnesses presented the viewpoints of the Association, of several state dental societies, the National Association of Dental Laboratories and a number of state laboratory groups. A decision by the Commission is expected in about 90 days.

Representing the A.D.A. were Walter E. Dundon, chairman of the Council on Dental Trade and Laboratory Relations; Harry Lyons, Association President; Raymond J. Nagle, dean of the College of Dentistry, New York University; J. Eugene Ziegler, director of the School for Dental Laboratory Technicians, University of California; John R. Thompson, chairman of the department of orthodontics, Northwestern University Dental School, and Mr. Renah Camalier of Washington, D.C., special counsel.

The four changes in the *Rules* sought by the Association were summarized by Mr. Camalier as follows: (1) that the definition of the commercial dental laboratory industry be extended to all those constructing dental appliances except licensed practicing dentists and their office personnel; (2) that the terms "design" and "occlusion" be eliminated and that the relationship between dentists and technicians be identified clearly in the *Rules*; (3) that the portions of the *Rules* which deal with advertising allowances, discriminatory services and exclusive deals be eliminated as having "no meaningful application to transactions to which a dentist is a party," and (4) that the jurisdiction of the *Rules* be expanded to include both ethical and nonethical segments of the dental laboratory industry.

Mr. Camalier was preceded by the other Association witnesses. Dr. Lyons elaborated on the need for a proper definition of the dental laboratory industry. He urged inclusion in the *Rules* of a statement recognizing the "impact of state dental laws on the relation between the dentist and the dental laboratory."

These state laws, he pointed out, "provide that the manufacture of a dental appliance is part of the practice of dentistry, and that an unlicensed person may not engage in any phase of the manufacture of a dental appliance unless he does so at the direction and under the supervision of a licensed dentist."

"The Association will vigorously protest the continuation of the *Rules* in their present form," he said, "and will regard as equally objectionable modified *Rules* which do not accurately reflect the limitations imposed by state dental laws on the function of . . . laboratories."

Dr. Dundon reminded the Commissioners that the American Dental Association is formally charged in its charter and bylaws with the "improvement of the health of the public." He warned that in their

The American Dental Association presented its case for revision of the Federal Trade Commission's Rules for the Commercial Dental Laboratory at an FTC hearing February 4 in Chicago. Reasons for the needed revisions were presented by (seated, l. to r.): Raymond J. Nagle, dean of the College of Dentistry, New York University; Harry Lyons, Association president; John R. Thompson, chairman of the department of orthodontics, Dental School, Northwestern University, Chicago; J. Eugene Ziegler, director of the School of Dental Laboratory Technicians, University of California, Los Angeles, and Walter E. Dundon, Chicago, chairman of the Association's Council on Dental Trade and Laboratory Relations. Acting as consultants were (standing): F. R. Aldrich of Columbus, Ohio; Clyde H. Schuyler of New York, and Renah Camalier of Washington, D. C., special counsel.

present form the *"Trade Practice Rules* may adversely affect the discharge of this obligation."

NADL Testimony • The National Association of Dental Laboratories, represented by Mr. Kelley E. Griffith of Washington, D.C., its counsel, also sought revision of the *Rules*. Mr. Griffith recommended that the terms "construction and manufacture" be substituted for "design and manufacture" in the description of the task of the laboratories. Additionally, he proposed that the word "articulation" be substituted for the present term "occlusion."

Mr. Griffith said that the NADL agreed with the American Dental Association's proposal to exempt licensed practitioners of dentistry from the *Rules* but felt that the suggested language was too broad. He urged retention of the sections of the *Rules* dealing with advertising and discriminatory deals as their elimination would mislead members of the industry into believing that such rules did not apply. He agreed with the Association that the *Rules* should contain a reference to the role of state laws in defining the relation between dentistry and the craft.

State Dental Societies • Charles A. Wilkie, secretary of the Dental Society of the State of New York, testified that his society "heartily supports and endorses the A.D.A. position." Dr. Wilkie was followed by Louis Brach of Jersey City, who said he was chairman of a special committee in New Jersey and of an interstate committee, including Massachusetts, New Jersey, Maryland, Delaware and the District of Columbia, which seeks outright repeal of the *Rules* as "definitely inimical to the dental health of the public and the profession as well."

Additional Testimony • During the afternoon session eight additional witnesses, representing state laboratory groups in New York and New England, testified in favor of retention of the *Rules* in their present form.

Opposing the A.D.A.'s request for modification of the *Rules* were Mr. Eric Blau of New York, director of industrial and public relations of the Dental Laboratories of the State of New York; Mr. Hugo Garganese of Providence, representing the Associated Dental Laboratories of Rhode Island; Ronald S. Gray of Melrose, Mass., of the Dental Laboratory Association of the State of Massachusetts; Mr. Earl Wilcox of Hartford, who said he represented 81 dental laboratory operators in Connecticut; Mr. Meyer Tescher of New York, president of the Dental Laboratory Association of the State of New York; Mr. Linn Eliason of Portland, past president of the Associated Dental Laboratories of Maine; Mr. Marvin Peck, of Hartford, president of the Connecticut State Dental Laboratory Association, and Mr. Ben Sternberg of New York City, a laboratory owner.

A.D.A., N.A.D.L MEET; PLAN SERIES OF CONFERENCES

A schedule of future conferences between the American Dental Association and the National Association of Dental Laboratories to deal with programs for certification and accreditation of dental laboratory technicians and laboratories will be developed within 30 days, according to a joint statement of the two associations.

The statement was issued at the close of a February 3 conference held at the A.D.A. headquarters in Chicago. At the initial conference, short papers outlining problems pertaining to technicians and laboratories were presented by representatives of each group. Informal discussion followed, which the associations said pointed "to the complexity of the problems" and indicated the need for a series of conferences "to study the details of the several problems presented and subsequently to develop solutions acceptable to both the profession and the craft in the interest of public welfare."

The A.D.A-NADL statement said, "The conferees met in an unusually fine atmosphere of amity and cordiality."

Conference participants were: Mr. Nathan Cooper, president, and other National Association of Dental Laboratories officials and representatives including Mr. J. F. Auderer, Jr., Mr. Horace Denner, Mr. Homer Dickson, Mr. Harold Eiserloh, Mr. Kelley E. Griffith, Mr. Paul L. Jones, Mr. George Klein, Mr. Arthur Koorse, Mr. Don Neuenschwander, Mr. Ralph Rothstein, Mr. Max Schoenfeld, Mr. Paul A. Slone, Mr. G. Paul Stough, Mr. Meyer Tescher, and Mr. Victor Van Fleet; and Harry Lyons, president, and several trustees and other American Dental Association officials including John Abel, William R. Alstadt, Herbert Bain, Bernard Beazley, Herbert Bunker, Bernard Conway, Walter Dundon, Rudolph Friedrich, Howard Higgins, Harold Hillenbrand, Paul Jeserich, Carl Laughlin, Lon W. Morrey, Harold Oppice, Shailer Peterson, Arthur Schopper, Reginald Sullens, Lewis Thom, and Robert Wells.

MAY WORKSHOP TO DEAL WITH LAB ACCREDITATION PLANS

A special conference to deal with the Association's policies on accreditation of dental laboratories and its programs for maintaining proper relations between the profession and the craft has been scheduled for May 6-8, announces Walter E. Dundon, chairman of the Council on Dental Trade and Laboratory Relations. The conference will be held in Chicago, Dr. Dundon states. A two day meeting of the Council will follow the workshop.

Meanwhile, the Council has made available to interested persons copies of

two publications, *Principles for Guidance of Constituent Societies in Formulating and Administering Programs for Accrediting or Approving Dental Laboratories* and *Program for Maintaining Proper and Effective Relations Between the Dental Profession and the Dental Trade and Laboratory Groups*. Copies are available on request to the Council at the Central Office.

ASSOCIATION TESTIFIES ON NEED FOR NIDR BUILDING

As THE JOURNAL went to press, Association representatives were preparing testimony, to be presented within a few days, urging a Congressional committee to approve appropriation of funds for a building for the National Institute of Dental Research.

Slated to lead off for the Association was Harry Lyons, dean of the School of Dentistry, Medical College of Virginia, and Association president. Hearings are now being held by the subcommittee on health of the House Appropriations Committee on the proposed budget for the Department of Health, Education and Welfare, which includes the askings for NIDR activities.

The Association also is urging increased funds for the extramural program of the NIDR, primarily for its training grants program, under which grants are made to schools for the training of researchers.

RETIREMENT BILL PASSAGE URGED BY 25 SOCIETIES

Resolutions urging passage of a measure to aid self-employed persons in setting up their own retirement plans have been sent by 25 dental societies to members of Congress. The measure, known as the Jenkins-Keogh bill, would allow self-em-

All Air Force dental officers at Little Rock Air Force Base, Little Rock, Ark., either renewed or applied for membership in the American Dental Association January 29. They will become members of the national organization through membership in the Arkansas State Dental Association and the Central District Dental Society. The three civilian dentists shown with the officers are (l. to r.): William R. Alstadt, Association president-elect; E. D. Jernigan, president of the Central District Dental Society, and F. R. Bollen, society secretary. The Air Force dentists are (l. to r.): H. B. Steele; L. I. Brant; M. L. Bennack; M. E. Petrovsky; George App; J. D. Curl; C. D. Disheroon, base dental surgeon; C. H. Keener, and G. N. Brinker.

ployed persons to deduct from yearly income a limited tax-free amount to be placed aside in a retirement fund. Taxes would be paid when the individual retired and began collecting his pension. The measure would allow the self-employed to obtain benefits similar to those enjoyed by employees of corporations with pension plans. At least eight of the society resolutions have appeared in the *Congressional Record* at the request of Congressmen.

A.D.A. OFFICIAL NAMED TO KEY POSTS IN CONVENTION GROUPS

John J. Hollister, American Dental Association business manager, has been named to key posts in two convention organizations. The newly formed Professional Convention Management Association, composed of representatives of leading national health groups, chose him for its first secretary January 25 at a founding meeting in Philadelphia. Purpose of the organization is to provide for the better conduct of conventions serving professional health organizations and allied groups.

In Philadelphia, Mr. Hollister was also chosen chairman of the 1958 conference of the Advisory Council on Medical Exhibits. The council is composed of leading exhibitors and exhibit managers in the dental, medical and associated fields.

SEE EXPANDED USE OF NATIONAL BOARD EXAMINATION

An expanded use of the National Board Examinations was forecast last month at a meeting in Chicago of the Council of the National Board of Dental Examiners. The increased use of the examinations was predicted by Council chairman Robert I. Humphrey of Chicago after the Council revised the rule requiring full citizenship of those who take the examinations.

All applicants are still required to be students in or graduates of dental schools approved by the Council on Dental Education, Dr. Humphrey said.

In taking its action, the Council pointed out that citizenship requirements vary from state to state, and that it was appropriate, therefore, to leave such requirements to the jurisdiction of the states.

It was reported to the Council that 5,580 applicants took the National Board examinations in 1956, the largest number ever to be tested.

In a second action, the Council approved the experimental edition of the test entitled "Principles of Medicine—Physical Diagnosis." The test will be tried out in 15 dental schools. Results will be analyzed for validity and reliability before the test is included in the National Boards.

NEARLY $84,000 PAID FROM RELIEF FUNDS, COUNCIL HEARS

Nearly $84,000 was paid out to dentists in 1956 from the national and state society relief funds, it was reported at the February 17 and 18 meeting in Chicago of the Council on Relief.

H. R. Bleier of Milwaukee, Council chairman, stated that $41,743 had been paid by the American Dental Association Relief Fund to match amounts contributed by constituent societies.

Dentists who received aid in 1956 ranged in age from 29 years to 91 years. The average age was 68, Dr. Bleier said. The greatest amount received by a dentist from the combined funds was $200 a month; the smallest, $20 monthly. The most common amount was $100. Payments were made to 106 individuals.

Dr. Bleier announced also that contributions to the Golden Anniversary Relief Fund Drive totaled $117,751.82 as of February 15, an amount well over the $100,000 goal. The goal was met faster than in any previous drive, he reported.

A.D.A. SHOWS DENTIST'S ROLE IN EXHIBIT FOR SMITHSONIAN

The role of the dentist in maintaining health will be portrayed in a special exhibit being prepared by the American Dental Association for display at the Smithsonian Institution in Washington, D. C. The three-paneled exhibit, which shows the dentist in research, prevention and treatment of disease and in community health, will be in the Hall of Health some time in April with similar exhibits showing the role of other health workers. Two million people visit the Smithsonian Institution's health exhibits each year.

DENTAL EDUCATORS EXPLORE SOURCES OF FINANCIAL AID

The financial needs of dental schools are great, and every possible source of support must be explored if those needs are to be met, a panel of dental educators asserted February 4. Possible sources include federal and state appropriations, foundation support, the Fund for Dental Education, business and industry and alumni of dental schools, said panel members.

Speaking on "What sources of financial support for dental education are available?" at the Thirteenth Congress on Dental Education and Licensure at the Conrad Hilton Hotel, Chicago, were:

Joseph F. Volker, dean of the School of Dentistry, University of Alabama; Raymond J. Nagle, dean of the College of Dentistry, New York University; Maynard K. Hine, dean of the School of Dentistry, Indiana University, and J. Willard King, president of the United Fund of Evanston. Harold W. Oppice, a member of the Council on Dental Education and a past president of the American Dental Association, served as moderator.

The 45 dental schools in the United States have an estimated need for nearly $85,000,000 for construction and remodeling of their education and research facilities, Dean Volker said, adding:

"It is obvious that American dental schools have need for increased operating funds. Tuition and fees contribute only 22 per cent to 43 per cent of the budgeted monies. Although clinic income has made a substantial contribution to dental school operating funds in the past, a limited amount of support is received presently from these sources. The greatest portion of dental school income is from state appropriation or university subsidy."

Dr. Volker pointed out that federal programs are now contributing funds for dental service and research programs and that grants for dental educational facilities from the same source seem inevitable. The training of dental teachers and research workers with federal subsidy is possible, the dean said. "The action of certain states in giving financial support to the operating budgets of dental schools under regional agreements is most encouraging," he added.

Foundations whose interest is in the geographic locality of the dental school or in the educational institution with which the dental school is affiliated provide the best opportunities for support of dental education programs, said Dean Nagle. "Foundation trustees who are known friends of dentistry or of your dental school in particular provide excellent avenues of approach for support," he stated.

Of the 4,162 foundations existing in 1955, only six so much as mentioned dentistry, said Dean Hine. He said the Fund for Dental Education, recently organized as a foundation by the American Association of Dental Schools, would prove to be a valuable asset for dental education, and deserved the support of everyone interested in dental education.

The fear that the federal government would try to interfere in the work of dental schools to which it contributed funds was unfounded, it was declared by Dean Volker and Russell A. Dixon, dean of the

College of Dentistry, Howard University.

An afternoon panel dealt with "What activities would promote the most effective relationship among the state dental examining boards, the state dental societies and the dental schools?"

Participants were Robert H. Davis, president, West Virginia State Dental Society; Russell I. Todd, past president, American Association of Dental Examiners; Harold J. Noyes, dean of the Dental School of the University of Oregon, and James D. Kelly, president of the Wisconsin State Dental Society. Carl A. Laughlin, chairman of the American Dental Association's Council on Dental Education, served as moderator.

Panelists agreed that close liaison between dental societies, schools and state boards would promote the attainment of the common objective of both—the protection of the public from unethical and unqualified persons. Among activities to be undertaken would be the joint sponsoring of short courses for dentists, in which the experience of teachers, practitioners and examiners might be pooled; joint meetings to discuss policies of each group and the use of each others' facilities for activities of each. A further suggestion was that the responsibilities of state boards be reviewed to determine whether they have adequate financing. The drive to find funds is a task in which the societies must take a major part, it was suggested.

MODERNIZE BOOK DESIGNED FOR RECEPTION ROOM READING

Teeth, Health and Appearance, a book long popular for reception room reading, will appear in a revised edition about mid-March, announces Perry Sandell, director of the Bureau of Dental Health Education. The 48 page, hard cover volume has a modernized format and new illustrations; about half these are in color. The book is designed for reading by teen agers and adults. The many dental health problems of its readers are discussed in terms of solutions possible when dentist and patient work together. The revised book is expected to sell for $3.50 and may be obtained from the Order Department at the Central Office.

ITEMS IN 159 PERIODICALS COMPILED IN 1956 INDEX

The 1956 *Index to Dental Literature,* available this month in a bound volume, contains references to nearly 6,000 items which appeared in 159 publications during the year, announces Donald Washburn, director of the Bureau of Library and Indexing Service.

Items are listed both by author and subject. Cross-references are included to facilitate use of the *Index,* Dr. Washburn reports. In all, there are approximately 12,000 entries. These include articles, editorials, reprints, abstracts and obituaries. Additionally, articles from DENTAL ABSTRACTS, newest publication of the Association, which appeared originally in languages other than English, also have been listed. Thus the user of the *Index* has access to literature references not previously available.

A list of dental books published in English during the year also is included. The *Index,* which is published quarterly, and in a bound edition at the end of the year, may be obtained from the Subscription Department at the Central Office. Subscription price is $20 for the quarterly cumulative service; for the annual bound volume, $10.

BROCHURE LISTS NEW AUDIO-VISUAL MATERIALS

Audio-visual materials added to the Association's Film Library since 1954 are listed in a new supplement to the brochure *Audio-Visual Materials in Dentistry,* prepared by Helaine S. Levin, Film Librarian. Included are 68 new film titles, 15 new slide titles and three film strips.

Additionally, the brochure lists films and slides which have been cleared for television.

New features of the brochure include suggestions for materials suitable for use in the dentist's office for education of patients, descriptions of inexpensive audio-visual equipment for such use, an explanation of how films are previewed and selected by the Film Library and a list of sources from which audio-visual materials may be obtained. The publication also contains the names of books and magazines useful as references in the preparation and use of audio-visual materials.

DENTAL ABSTRACTS PROVIDES EDUCATION IN A CAPSULE

DENTAL ABSTRACTS, the Association's publication which selects and digests articles each month from the world dental literature, provides the busy practitioner with "education in a capsule," according to Lon W. Morrey, Association editor.

"The busy dentist doesn't have time to read the hundreds of articles which appear in dental journals each month, yet to carry out his work effectively he must keep abreast of latest knowledge and technics in dentistry," the editor pointed out. "DENTAL ABSTRACTS was designed to solve this problem. By condensing articles from dental and allied periodicals and by publishing them in a single magazine, the publication in a sense provides the dentist with an education in a capsule. He gets an overview of what is happening in world dentistry and, in addition, can read articles of particular importance to him in their original full length by sending to the Association's library for them."

Subscriptions to DENTAL ABSTRACTS may be obtained for $6 in the United States; $7 abroad, from the Subscription Department at the Central Office. More than 6,500 dentists now subscribe to this monthly publication.

SUBSCRIPTS • William R. Alstadt, Association president-elect, will address the twelfth national conference on rural health of the American Medical Association Council on Rural Health March 7-9 in Louisville, Ky. Title of Dr. Alstadt's talk is "Dental Health and Farm Families." . . . An address by Rudolph H. Friedrich, secretary of the Council on Dental Health, before the midyear conference of presidents and secretaries of the American Hospital Association February 4 and 5 will be published in the April issue of A.H.A.'s magazine *Hospitals*.

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* For information about this new magazine see the back cover of this issue.

Dental Societies

HARRY LYONS TO BE CITED AT VIRGINIA BANQUET

Harry Lyons, president of the American Dental Association, will be honored at the annual banquet of the Virginia State Dental Association April 29. The banquet, planned for Dr. Lyons by the society as an "expression of its pride in his distinguished leadership," is part of a three day state meeting at the Cavalier Hotel in Virginia Beach. Dr. Lyons is a native of Virginia.

INDIANA RESEARCHERS WIN CHICAGO SOCIETY AWARD

Ralph W. Phillips, associate professor and chairman of the department of dental materials, University of Indiana School of Dentistry in Indianapolis, and Marjorie L. Swartz, instructor of dental materials at the school, were presented with the Chicago Dental Society's annual research award during the society's Midwinter Meeting February 3-6.

Dr. Phillips won the $500 award in 1948 and is the first repeat winner. The current citation was for experiments showing that when fluoride is present in dental restorative materials there is a lowered incidence of recurrent decay.

The Chicago Dental Society's Midwinter Meeting recorded the biggest registration since the World's Fair year of 1933. About 16,000 dentists and representatives of allied groups were in attendance. One of the largest scientific gatherings in the world, the four day meeting featured some 250 scientific and technical exhibits. Essays and demonstration clinics were emphasized on the scientific program.

Among participants in the January 18 and 19 workshop of district officers, sponsored by the council on dental health of the Missouri State Dental Association, were (l. to r.): Lynn Temple of Springfield, Mo., chairman of the state group's council on dental health; Max Kornfeld of St. Louis, president of the state society; Rudolph Friedrich, secretary, American Dental Association's Council on Dental Health; Harry Klenda of Wichita, Kan., president of the American Academy of Dental Practice Administration, and Perry Sandell, director, American Dental Association Bureau of Dental Health Education. The workshop was held in Jefferson City, Mo.

The society's committee on dental health education reported to the meeting that more than 200,000 Chicagoland school children received dental inspections from the society as a public service during the past year.

Edward W. Luebke, society president, announced that Chicagoans have financed approximately one million dollars in dental work during the first 21 months of the dental budget plan carried out by the society in cooperation with the First National Bank of Chicago.

Robert L. Kreiner served as general chairman of the Midwinter Meeting, and Lyle W. McNamara was chairman of the program committee.

CAMDEN, N. J., DENTAL CLINIC DEDICATES NEW BUILDING

The Camden (N. J.) Free Dental Clinic on February 6 dedicated a new dental clinic building as part of its celebration of National Children's Dental Health Week. The Clinic, organized in 1880 by Camden dentists, provides free dental services for the indigent. Clinic president is Carl E. Trebing, Jr. The secretary is Alex A. Colalillo.

SUBSCRIPTS • Eight hours of closed circuit color television is a high light of the March 26-29 Greater Philadelphia dental meeting at the Sheraton Hotel. The program is provided by Smith-Kline-French Co. Albert L. Borish of Philadelphia is general chairman. . . . The Vermont State Dental Society meets May 26-28 at the Equinox House in Manchester, Vt. . . . More than 18 million dollars in dental health care has been financed through the Los Angeles County Dental Society's postpayment plan during its six years of operations, officers of the plan report. . . . The Metropolitan District Dental Society, a component of the Massachusetts State society, feted noted oral surgeon Kurt H. Thoma at a testimonial dinner January 23 in Boston. Over 300 New England dentists attended.

Dental Education

DEANS OF SOUTHERN SCHOOLS FORM PERMANENT CONFERENCE

Deans of nine southern dental schools at a meeting January 12 and 13 formed a permanent organization, the Southern Conference of Dental Deans. The incorporated organization will provide a means for the exchange of ideas and for the implementation of improved dental education programs in the South. Previously, the deans had met on a more informal basis.

Member deans are from the following dental schools: University of Louisville, University of North Carolina, Medical College of Virginia, Emory University, University of Tennessee, University of Alabama, Loyola University (New Orleans), Baylor University and the University of Texas.

Officers for the coming year are John V. Olson, dean, University of Texas Dental Branch, president; James T. Ginn, dean, College of Dentistry, University of Tennessee, vice-president, and Arthur H. Wuehrmann, assistant dean, University of Alabama Medical Center, secretary-treasurer.

PANEL, CASE REPORTS PART OF DRUG THERAPY SYMPOSIUM

A panel of dentists and physicians will discuss medications for diseases of dental origin during a day-long meeting sponsored by the Indiana University School

of Dentistry March 13. The program will be held at the Indiana State Board of Health building in Indianapolis.

The panelists will discuss drug therapy for a number of case histories presented to it, involving gingivostomatitis, acute facial cellulitis, dry socket and complications after the removal of teeth.

Additionally, three essays will be presented. Participants in the program include R. S. Ping, D.D.S., department of oral surgery, Indiana University School of Dentistry; J. Roy Doty, Ph.D., secretary, American Dental Association Council on Dental Therapeutics; C. J. Carr, Ph.D., chairman, pharmacology department, Purdue University School of Pharmacy, and Ralph Frickenstein, D.D.S., Indianapolis General Hospital.

Others are: Estell E. Morris, D.D.S., and Jackson Todd, D.D.S., of the Indiana University dental school and medical center, respectively; D. C. Hines, M.D., V. C. Hackney, M.D., and Arthur J. Baptisti, Jr., M.D., of Eli Lilly & Co.; R. S. Griffith, M.D., and E. M. Gruber, Jr., M.D., of Lilly Laboratory for Clinical Research.

MAY 26 TESTIMONIAL HONORS L. R. MAIN, ST. LOUIS DEAN

Lee Roy Main, dean of the St. Louis University Dental School, will be honored May 26 at a dinner climaxing the annual St. Louis University Dental Alumni meeting. Dr. Main celebrates his fiftieth year of dental practice in June.

In addition to his deanship, Dr. Main currently holds the presidency of the American Association of Dental Schools. He is a past president of the St. Louis Dental Society and a past vice-president of the Missouri State Dental Association. In 1948, he was chairman of the American Dental Association's Section on Roentgenology.

He serves as consultant to the John Cochran VA Hospital in St. Louis and

Lee Roy Main

formerly was consultant to the American Dental Association's Council of the National Board of Dental Examiners.

Among Dr. Main's professional affiliations are the American Society for the Advancement of Oral Diagnosis, the American Association for the Advancement of Science, the American Association for Dental Research and the Fédération Dentaire Internationale.

B. E. LISCHER, EX-DENTAL DEAN, HONORED BY ST. LOUIS SCHOOL

Benno Edward Lischer, dean emeritus of the Washington University School of Dentistry (St. Louis), was one of seven faculty members honored for "outstanding achievement and service" at the University's annual Founders' Day observance February 20. The award was made by the Alumni Federation.

Dr. Lischer, a pioneer in the study of orthodontics, retired as dean of the School of Dentistry in 1945. He is the author of three textbooks and a frequent contributor to professional publications. In 1951, he received the Albert H. Ketcham Award, highest award of the American Association of Orthodontists. In 1956, he was cited for 50 years of service to his profession by the St. Louis Dental Society.

The 80 year old orthodontist is a graduate of Washington University's dental school. He has served as president of the

American Association of Orthodontists and the American Association of Dental Schools. He is a Fellow of the American Association for the Advancement of Science. Among his other professional affiliations are the International Association for Dental Research and the American Medical Association.

GRADUATE STUDY FELLOWSHIPS OFFERED BY VIRGINIA SCHOOL

The Medical College of Virginia School of Dentistry in Richmond offers fellowships for graduate study. The fellowships, made available in part through a dental research and teacher training grant from the National Institute of Dental Research, provide annual stipends of $4,000 to $5,000. Students receiving fellowships may work toward M.S. or Ph.D. degrees. Information on the program may be obtained from H. T. Knighton, director of graduate instruction, at the school in Richmond.

SHORT COURSES SCHEDULED FOR PRACTICING DENTISTS

Alabama • May courses announced by the University of Alabama School of Dentistry in Birmingham are emergency care in the dental office May 4-6 and practical root canal therapy May 11-13. Emanuel Cheraskin teaches the May 4-6 course; Adeeb E. Thomas, the May 11-13 program.

Columbia • Columbia University School of Dental and Oral Surgery in New York offers a course in the management of temporomandibular joint disorders by Laszlo Schwartz May 1-3. The diagnostic and therapeutic procedures developed as a result of investigations at the temporomandibular joint clinic will be presented. Registration deadline is April 9.

Indiana • April 17 and 18 are the dates of a postgraduate course in endodontics to be taught at Indiana University School of Dentistry in Indianapolis. The course is an elementary one for those interested in learning or reviewing the fundamentals of endodontics. It will include lectures, discussions and demonstrations. Harry J. Healey will lead a faculty of seven.

The school has announced a symposium on crown and bridge construction on April 3 at the Indiana State Board of Health Building in Indianapolis. Two approaches to advanced treatment in oral rehabilitation will be discussed as well as the clinical and laboratory aspects of new impression materials.

Pennsylvania • The School of Dentistry, University of Pennsylvania, in Philadelphia announces a postgraduate course in immediate root resection June 3-8. Louis I. Grossman, Leonard Parris and associates will instruct. The course is designed to teach dentists a simplified root resection technic and to give them clinical practice in the completion of the entire procedure in one hour. Participation is limited to those who previously have taken a postgraduate course in endodontics.

Washington • Occlusal equilibration will be taught at the School of Dentistry, Washington University in St. Louis, May 6-8. Harold R. Schreiber, who will direct the course, is assistant professor of anatomy in the school and is a specialist in periodontics and oral diagnosis. June 3-7 the school offers a course in oral surgery designed for the general practitioner. It will be directed by Leroy W. Peterson, clinical professor of oral surgery.

Washington • The American Cancer Society, Washington division, and the University of Washington School of Dentistry in Seattle will present their eighth annual refresher course in cancer of the oral region March 30 and 31. James R. Hayward, professor of oral surgery at the University of Michigan School of Dentistry and director of the section of oral surgery at University of Michigan hospital, will teach along with members of the Washington school's faculty. The course will include lectures, a panel discussion and a question and answer period.

SUBSCRIPTS • The thirty-fourth annual meeting of the American Association of Dental Schools will be held March 24-27 at the Haddon Hall Hotel in Atlantic City, N.J. Lee Roy Main, dean of the School of Dentistry, St. Louis University, is president of the group. Z. John Gregory, a faculty member of the School of

Dentistry, Temple University, is meeting chairman. . . . The Eighth Berkshire Conference in Oral Pathology and Periodontology, sponsored by Tufts University School of Dental Medicine, will be held in Lenox, Mass., June 16-20. Information may be obtained from Irving Glickman, director, at the school in Boston.

Public Health

ASK DENTISTS' SUPPORT OF NEW YORK FLUORIDATION

As part of a campaign to secure fluoridation for New York City, the Committee to Protect Our Children's Health, Inc., has asked dentists throughout the nation to write or telegraph their views on fluoridation to New York Mayor Robert F. Wagner. A public hearing on the measure will be held March 6. The hearing will be conducted by the city's Board of Estimate, which has the power to make a decision without submitting the matter to referendum.

The Committee to Protect Our Children's Teeth is headed by Benjamin Spock, M.D., well-known pediatrician. Among its members are C. Raymond Wells of Brooklyn, former American Dental Association president, and Herbert L. Taub of Jamaica, N. Y., president of the Dental Society of the State of New York.

Fluoridation has been recommended for the nation's largest city in three separate reports of the city board of health. The measure has been opposed by the Department of Water Supply, Gas and Electricity.

Reports from other parts of the country reveal that the caries-preventive measure will be in operation in a number of communities shortly. It was officially approved for the city of Oroville, Calif. (population 5,387) last month. The State Public Utilities Commission's directive to the California Water Service Co. to start fluoridation in Oroville is believed to be the first of its kind ever issued by a state regulatory body to a private company.

The measure has been approved also for Kelso, Wash., where the city council agreed to initiate the program after an advisory referendum last November.

The Army reports that Fort Benning, Ga., will begin fluoridation within a few months. A recent release from the Department of the Navy reveals that 37 Navy and Marine Corps stations now fluoridate their water supplies.

Fluoridation has been reported for Winnipeg, Canada's largest city to adopt the procedure thus far. With the addition of the 410,000 residents of Winnipeg, 900,000 Canadians now drink fluoridated water. And in Formosa, the health measure has been installed at Kaohsiung, first city on the Island to adopt the procedure.

NO RELATION FOUND BETWEEN ARTHRITIS AND FLUORIDATION

A new study reports that drinking fluoridated water will not cause arthritis. The study, conducted at the University of Rochester School of Medicine and Dentistry by Charles LeRoy Steinberg, Dwight E. Gardner, Frank A. Smith and Harold C. Hodge, was reported to the American Rheumatism Association at its third scientific session in Bethesda, Md.

The investigators examined the fluoride content of bone, ligament and muscle in arthritic and normal individuals ranging in age from 40 to 86 years. They found that in arthritic patients the fluoride content of involved joints was normal.

"These studies indicate that there is no relationship between various arthritis conditions and the musculoskeletal diseases," the researchers reported. "This study should dispel the fear that fluoridation of water as recommended by health authorities is a causation factor in arthritis conditions," they said.

The investigation confirmed results of an earlier study made by the same scientists.

EVANSTON REPORTS DENTAL DECAY DOWN 85 PER CENT

The tenth anniversary of fluoridation in Evanston, Ill., was marked in mid-February by the announcement that dental decay among the city's children is now 85 per cent less than it was in 1947, the year fluorides were added to the water supply.

J. Roy Blayney, professor emeritus of the University of Chicago, who directs the Evanston fluoridation study, reported that six year olds, born after the start of the fluoridation program, and examined in 1954 and 1955, showed a reduction of 86.5 per cent in the dental caries rate over the base year. Six year olds observed in 1952 showed a 68.5 per cent drop.

MARCH 29 IS DEADLINE FOR USPHS HEALTH EDUCATOR EXAM

Applications for the next U. S. Public Health Service examination for appointment as health educators must be in the Surgeon General's office in Washington, D. C., no later than March 29, the USPHS has announced. The examination will be held May 7, 8, 9, and 10. Those taking the examination will be notified of the test locations.

Appointment of officers in the health educator category are made in grades equivalent to the Navy grades of lieutenant, j.g., and lieutenant. Starting salary for an officer with dependents is $4,817 and $5,718 a year.

Health educators work at local, state, national or international level in aiding the planning, development and evaluation of health education programs.

Those who complete the examination successfully will be placed on the roll from which appointments will be made to fill current vacancies and those occurring within the next two years. Additional information on the examination may be obtained from the U. S. Public Health Service, Washington 25, D. C.

REQUESTS FOR PUBLIC HEALTH STUDY GRANTS DUE APRIL 1

Applications for grants awarded by the U. S. Public Health Service for public health study are now being accepted. Dentists and dental hygienists wishing to begin their traineeships in the fall semester must apply for a grant by April 1. Application may be made to a school of public health which has received a training grant or directly to the chief of the division of general health services, Bureau of State Services, USPHS, Washington 25, D. C.

Traineeships are awarded only to those who have completed their basic professional education and are made for a maximum period of one year. Stipends are from $2,400 to $4,800; the amount determined by the academic degree held by the candidate.

Funds for the public health training program were made available by Congress last year. To date, more than 300 traineeships have been awarded.

LAB DISPLAY ADS BANNED FROM CHICAGO PHONE BOOK

Advertisements by dental laboratories in the 1957 Chicago classified phone book have been limited in size to one column, two inches. The advertisements carry the line "For the Dental Profession Only."

These requirements were issued by Reuben H. Donnelley Corporation, publisher of the *Red Book,* to conform with the Illinois statutory restriction on dental laboratory advertising. The action was taken after the Chicago Dental Society won a suit against 24 advertising laboratories. The Illinois Supreme Court for-

bade the laboratories from advertising directly to the public, and the U.S. Supreme Court dismissed the laboratories' appeal, thus upholding the state court.

National Defense

AIR FORCE DENTAL CHIEF PROMOTED TO MAJOR GENERAL

Brig. Gen. Marvin E. Kennebeck, chief of the Air Force Dental Corps, has been appointed to the rank of major general by President Eisenhower. All heads of the military dental corps now hold two star rank.

General Kennebeck has been chief of the Air Force Dental Service since 1952 and was promoted to brigadier general that same year. He has served through various grades at U.S. military stations in the United States and overseas, including Hawaii, Corregidor, the Philippines and Germany.

He was third-vice president of the American Dental Association for the 1955-1956 term. General Kennebeck is a Fellow of the American College of Dentists.

CIVIL DEFENSE TRAINING FOR DENTISTS OFFERED IN MARCH

A health services planning course directed to dentists, physicians and other health personnel is being offered March 4-8 in Battle Creek, Mich., by the Federal Civil Defense Administration.

In announcing the course, FCDA dental consultant Russell W. Bunting reminded dentists that in the event of emergency, the dental profession will play a major role in the treatment of mass casualties. Among subjects to be covered by the course are civil defense organization, stockpile program, management of sick and injured, psychologic considera-

Three students from abroad are studying at the Walter Reed Army Institute of Research. Shown above are (l. to r.): Col. Thomas A. McFall, director of the division of dentistry at the Institute; the three students, Lt. Farmarz Bassary of the Iranian Army Dental Corps, Capt. Yasar Yatmaz of the Turkish Army Dental Corps and Maj. G. C. Evans of the Royal Canadian Dental Corps; Col. Richard P. Mason, commandant of the Institute, and Brig. Gen. Arthur L. Irons, director of dental activities at Walter Reed Army Medical Center.

tions in nuclear warfare, medical care planning and hospital disaster planning. Dentists interested may write to Dr. Bunting at the FCDA in Battle Creek.

The health services training course will be repeated April 15-20 in Atlanta, Ga.

International

INTERNATIONAL DENTAL MEETINGS

35th General Meeting I.A.D.R.	March 21-23	Atlantic City, N. J.	D. Y. Burrill	129 E. Broadway, Louisville, Ky.
Int. Dental Congress of Paris	April 11-17	Paris, France	Semaine Odontologique	31 Rue Tronchet, Paris 8
Nat. Dent. Convention Japan Dental Association	April 28-30	Tokyo, Japan	Toshio Kashima	3-1 Chome, Ogawamachi, Kanda, Chiyodaku, Tokyo
U.S.C. Dental Study Club of Mexico	May 12-16	Mexico City, Mexico	Roberto Woodworth	Melchor Ocampo #487-302, Mexico D.F.
Deutsche Gesellschaft für Kieferorthopädie	May 30	Koblenzestr. 100 Bonn	Erich Hausser	Martinistr. 52 Hamburg, Germany
Congrès d'Orthopedie Dento-Faciale	May 30-June 2	Paris, France	Mme. L. Muller	31 Rue de Moscou, Paris
Congrès Suisse d'Odontologie	May 31-June 2	Burgenstock, Switzerland	Secretary	SSO, Spitalgasse 37, Berne
3rd Int'l. Medical & Surgical Meetings, Med. & Health Exhibition	June 1-9	Turin, Italy	B. Roccia	University of Turin, Corso Polonia 2, Turin
Europ. Org. for Research on Fluorine & Dent. Caries Control	June 8-10	Malmo, Sweden	H. J. Schmidt	Obere Weinsteige 5, Stuttgart-Degerloch, Germany
Annual Meeting of Canadian Dental Association	June 23-26	Winnipeg, Canada	D. W. Gullett	234 St. George St., Toronto 5
Annual Conference British Dental Assoc.	July 1-5	Newcastle on Tyne, England	H. P. Buchanan	13 Hill St., Berkeley Sq., London W. 1
American Dental Society of Europe	August 28-31	Lausanne, Switzerland	J. P. Moloney	110 Harley St., London W. 1
12th International Dental Congress	Sept. 7-14	Rome, Italy	Pio Lalli	Via Boezio 16, Rome

16th Congrès Français de Stomatologie	End of Sept.	Paris, France	J. Baras	30 Ave. Felix Faure, Paris 15
Österreichische Zahnärztetagung	Early Oct.	Krems, Austria	Franz Schönbauer	Währingerstr. 25a, Vienna 9
Annual Meeting Norwegian Dental Association	Mid-Oct.	Oslo, Norway	Knut Gard	Incognitogatan 17, Oslo
98th Annual Session American Dental Association	Nov. 4-7	Miami, Fla.	H. Hillenbrand	222 E. Superior St., Chicago 11, Ill.
National Congress of Asociacion Dental Mexicana	Nov. 10-14	Mexico City, Mexico	Erik Martinez Ross	Sinaloa 9, Mexico D.F.
European Orthodontic Society	July 2-7, 1958	Copenhagen, Denmark	A. Bjork	Royal Dental College 4, Universitetsparken, Copenhagen
Annual Conference British Dental Assoc.	July 7-12, 1958	Dundee, Scotland	H. P. Buchanan	13 Hill St., Berkeley Sq., London W. 1
46th Annual Meeting Fédération Dentaire Internationale	Aug. 27-Sept. 2, 1958	Brussels, Belgium	G. H. Leatherman	35 Devonshire Pl., London W. 1.
Annual Meeting Canadian Dental Association	Oct. 5-8, 1958	Montreal, Canada	D. W. Gullett	234 St. George St., Toronto 5
99th Annual Session American Dental Association	Nov. 10-13, 1958	Dallas, Texas	H. Hillenbrand	222 E. Superior St., Chicago 11, Ill.
15th Australian Dental Congress	Feb. 23-27, 1959	Adelaide, Australia	M. J. Barrett	57 Grenfell St., Adelaide
100th Anniversary Deutsche Gesellschaft fur Zahn-, Mund-und Kieferheilkunde & 14th German Dental Congress	May 27-31, 1959	Frankfurt, Germany	F. H. Witt	Universitätsstrasse 73, Köln-Lindenthal, Germany
Annual Meeting Canadian Dental Association	Sept. 1959	Ottawa, Canada	D. W. Gullett	234 St. George St., Toronto 5
Centennial Celebration American Dental Association & F.D.I. 47th Annual Meeting	Sept. 21-24, 1959	New York, N. Y.	H. Hillenbrand	222 E. Superior St., Chicago 11, Ill.
Annual Meeting Canadian Dental Association	June 1960	Halifax, Canada	D. W. Gullett	234 St. George St., Toronto 5
101st Annual Meeting American Dental Association	Oct. 17-20, 1960	Los Angeles, Calif.	H. Hillenbrand	222 E. Superior St., Chicago 11, Ill.

William R. Alstadt, president-elect of the American Dental Association (center), was honored at a banquet January 15 during the meeting of the Mexican Dental Association in Mexico City. With Dr. Alstadt are (left): Francisco Raul Amanda, past president of the Mexican organization, and Salvador Tercero Elizalde, president; (right) Robert M. Ruff, president-elect, and Tiberio Wallentin, treasurer. Not shown are two American dentists who appeared with Dr. Alstadt on the program, William L. Casey and Roy F. Golden, both orthodontists of Little Rock, Ark.

ADDITIONAL TOURS PLANNED FOR F.D.I. CONGRESS

With the approach of the Twelfth International Dental Congress of the Fédération Dentaire Internationale, additional tours designed for dentists are being announced. The FDI meeting is September 7-14 in Rome, Italy.

Among tours available to Congress visitors are nine tours sponsored by C. W. Carrick of Oberlin, Ohio. The tours, varying in length from 23 to 62 days, visit from two to nine countries. Illustrated folders of trip information are available from Dr. Carrick, Oberlin Bank Bldg., in Oberlin.

PARIS DENTAL CLUB SEEKS AMERICAN LECTURERS

Dentists from the United States who would serve as essayists or present table clinics at meetings of the American Dental Club of Paris are asked to write to Jean P. Roger, club president-elect. The club, which meets the first Thursday of each month, seeks speakers for its meetings for December of this year and for January through June of 1958. Interested dentists may write Dr. Roger at 174 Boulevard Haussmann, Paris. The American Dental Club of Paris is composed largely of dentists practicing in that city who have studied in American schools. Its present membership is about 60. All meetings are conducted in English.

General

OASI TAX PAYABLE WITH FILING OF 1956 INCOME TAX

Self-employed dentists must pay Old Age and Survivors' Insurance taxes for the first time this year when they file their 1956 federal income tax returns.

Such payments will be credited to the dentist's social security account number,

which must be obtained by him from his local Social Security office.

The self-employment tax due this year is equal to 3 per cent of net income from self-employment up to $4,200, or a maximum tax of $126.

Under the law, the self-employed person becomes eligible for benefits when he meets the following requirements:

1. If his sixty-fifth birthday has already occurred, or will occur before July 1, 1957, he must earn at the rate of at least $400 a year between January 1, 1956, and July 1, 1957.

2. If his sixty-fifth birthday will occur after July 1, 1957, he must earn at the rate of $400 a year during one of the following periods of time: between January 1, 1956, and his sixty-fifth birthday; for one-half the time between January 1, 1951, and his sixty-fifth birthday; for ten years between January 1, 1956, and his sixty-fifth birthday, or for ten years between his twenty-first birthday and his sixty-fifth.

The Act also provides benefits for the wife of a retired dentist and for his dependent children under 18. Additionally, lump sum death benefits are paid.

EDWARD C. MILLS DIES, WAS NOTED DENTIST, HISTORIAN

Edward C. Mills, historian and delegate repeatedly from the Ohio State Dental Association to the annual sessions of the American Dental Association, died January 22 at the age of 89. A life member of the association, Dr. Mills held many distinguished positions during his 68 years in the dental profession.

Edward C. Mills

He was president of the Columbus Dental Society in 1910 and of the Ohio State Dental Association in 1914. He served as editor of the state society's jour-

Two officers and an honorary member of the Academy of General Dentistry stand before its exhibit at the American Dental Association's annual session in Atlantic City, N.J., October 1-4. They are (l. to r.): Albert L. Kneb, secretary; Lon W. Morrey, honorary member, and editor of the American Dental Association, and George A. Holmes, director of the Academy's postgraduate studies. The group was formed to encourage practicing dentists to continue their professional education.

nal from the time of its founding in 1927 until November 1951.

Dr. Mills' interest in the history and literature of the profession led him to write such articles as "Historical Review of Dental Literature," "Dental Journalism—Its Influence on Dental Literature" and "A Bibliography of Dental Society Publications."

In 1905, Dr. Mills helped organize the dental section of the Columbus Public Library. At that time, it had 625 volumes. A $1,000 endowment from Dr. Mills maintains the section.

Dr. Mills was a Fellow of the American College of Dentists and of the International College of Dentists. He was also a member of the Fédération Dentaire Internationale, Delta Sigma Delta and Omicron Kappa Upsilon.

FIRM ISSUES NEW PAMPHLET IN SERIES ON DENTAL HEALTH

Church & Dwight Co., Inc., of New York, has just added a new 16 page booklet to its series of dental health educational materials. This latest booklet, entitled *Good Teeth for Young America,* urges youngsters to eat the right food, clean the teeth and obtain preventive care.

The pages are attractively illustrated, and the information presented is considered by the American Dental Association to be in conformance with current scientific knowledge. The booklets are distributed free on request to members of the dental profession, dental teachers and health workers. They may be obtained from the firm at 70 Pine St., New York 5.

SIGMA EPSILON COMBINES SEMINARS WITH F.D.I. TOUR

A five week tour of Europe has been combined with a series of dental seminars as a special project of Sigma Epsilon Delta, announces Martin Entine of Philadelphia, committee chairman. The fraternity has chartered a plane, for which reservations have already been completed, so that fraternity men and their wives may attend the coming F.D.I. Twelfth International Dental Congress in a group. The tour, arranged through Bartlett Tours in Philadelphia, will visit London, Amsterdam, Brussels, Paris, Geneva, Nice, Venice, Florence, Naples and Rome, site of the Congress.

Working with Dr. Entine on the committee are: S. Shames of Delaware, D. Berman of Maryland, A. Abrams of New Jersey, S. Rockoff of Connecticut and S. Meyer of New York. Information on the fraternity tour may be obtained from Dr. Entine, 3037 N. Broad St., Philadelphia 32.

Also • An attempt by antifluoridationist F. B. Exner of Seattle to claim a $1,000 reward by proving that fluoridation has harmful effects was rejected February 4 in Lewis County, Wash., Superior Court. Dr. Exner had attempted to collect the money from the Chehalis Fluoridation League. Superior Court Judge John J. Langenbach in denying Dr. Exner's suit cited the testimony of Frederick McKay of Colorado Springs, Colo., and Robert Downs of Denver, both well-known scientists, who appeared at the trial of Dr. Exner's suit last August. . . . The Uptown Dental Forum of Chicago celebrates its tenth anniversary April 5-7 at Oakton Manor in Wisconsin. The forum has the enviable record of having met every week for the last ten years. Its active membership numbers nearly 100. . . . April meetings include those of the American Academy of Oral Pathology, April 7, at the Woodner Hotel, Washington, D.C., and the Academy of Denture Prosthetics, April 28 to May 4 in Columbus, Ohio.

TECHNICAL PROCEDURE IN ROOT CANAL TREATMENT

By Charles G. Maurice, D.D.S., M.S., Chicago.

Clinical experience has demonstrated that thorough débridement, good mechanical instrumentation and complete filling of the root canal is essential to success in root canal treatment. Effective root canal medication and an aseptic technic, although very important, cannot assure success of treatment without the aforementioned mechanical requisites. A successful technical procedure in root canal treatment has been devised.

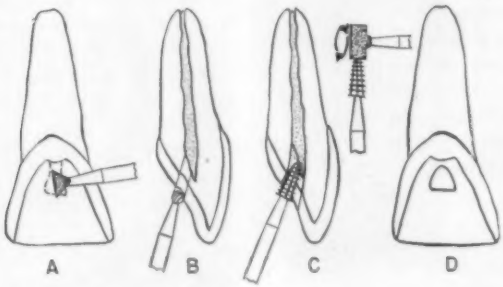

Fig. 1 • Access to the pulp cavity should be direct, provide good visibility and should remove as little sound tooth structure as possible. In an intact tooth, access is obtained as follows: (A) The starting point on the enamel is grooved with a mounted stone; this prevents slipping of the bur. (B) An opening to the pulp chamber is made with a round bur. (C) The opening is enlarged with a fissure bur. The cutting tip of the bur should first be blunted with a stone mounted in the handpiece. Such a bur will not create shelflike projections in the canal wall nor perforate the root. (D) The surface outline form of completed access to the pulp cavity should resemble the diagram.

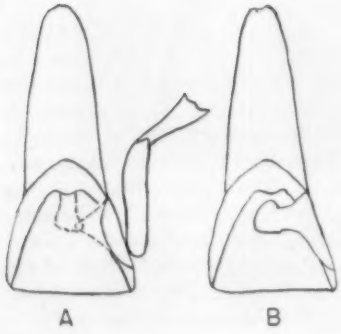

Fig. 2 • The carious tooth structure of a tooth with an exposed pulp is removed with spoon excavators and round burs (A). The surface outline form of completed access to the pulp cavity is shown in (B).

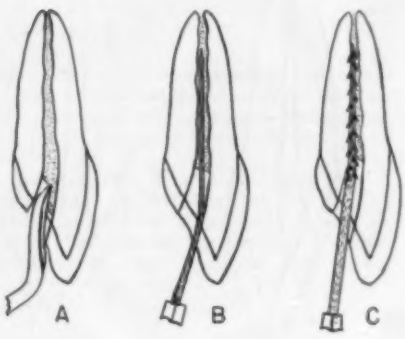

Fig. 3 • The pulp cavity may contain vital tissue, partially vital tissue or necrotic debris. Tissue and debris are removed, and the pulp cavity thoroughly cleansed. (A) The bulbous portion of the vital pulp or necrotic debris inside the pulp chamber is removed with spoon excavators or slowly revolving round burs. (B) Patency and direction of the root canal is explored with a smooth broach. (C) A barbed broach is inserted into the root canal to a depth approximately equal to the length of the tooth as estimated by study of the preoperative roentgenogram. The broach is given a one-quarter turn, withdrawn and given a second one-quarter turn. This procedure is repeated a third time and the broach is withdrawn. Tissue or debris adhering to the broach may be removed by brushing toward the handle with a straight handpiece prophylaxis brush.

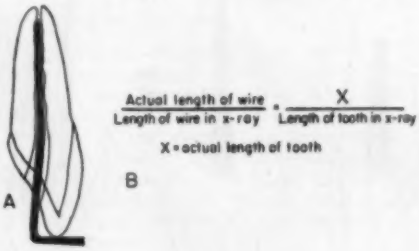

Fig. 4 • The actual length of the tooth (or of each root) should be ascertained. This will enable complete débridement and filling of the root canal. The measurement is obtained by inserting a wire or file with a 90 degree angle into the root canal. (A) The bent portion should be even with incisal edge or cusp tip. A roentgenogram of the tooth is taken. The length of the tooth may be calculated by solving the equation shown in (B) in which "X" represents the actual tooth length.

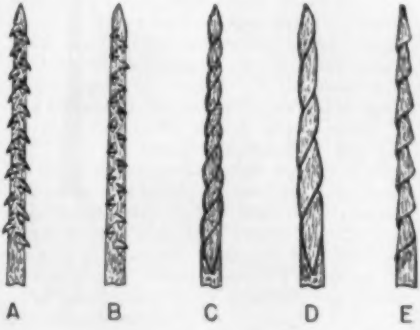

Fig. 5 • Mechanical preparation of the root canal removes pulp tissue and debris, the superficial layer of the canal wall (the most heavily infected), canal wall irregularities which usually interfere with medication and filling and also enlarges the canal so that it may be more readily filled. Root canal instruments used in mechanical preparation are: (A) barbed broach—for removing pulp tissue and loose debris, (B) rat-tail file—for enlarging the canal and removing wall irregularities, (C) spiral file—for enlarging the canal and removing wall irregularities, (D) reamer (spiral broach)—for removing obstructions and widening narrow canals and (E) Hedstroem file—for enlarging the canal and removing wall irregularities.

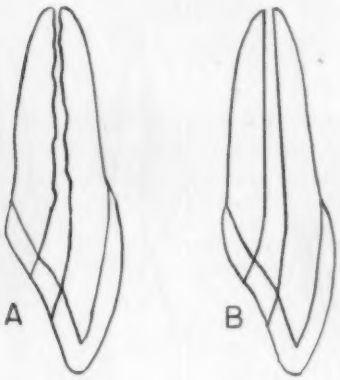

Fig. 6 • The root canal space should be obliterated with a stable, inert, nonirritating filling material. Canals may be filled with a combination of root canal cement and gutta-percha or silver cones. Narrow canals are generally best filled with cement and a single well-fitting cone. Whenever the diameter of the canal permits, it should be filled with cement, an initial well-fitting cone and extra cones of gutta-percha packed into the canal by means of root canal condensers and pluggers. (A) demonstrates the appearance of the root canal prior to instrumentation; (B) its appearance after instrumentation and before filling.

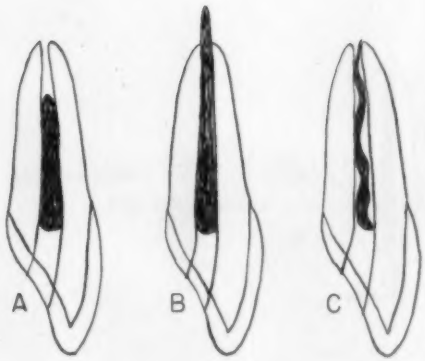

Fig. 7 • Poorly filled root canals are those in which the filling is short of the apex (A), extends beyond the apex (B) or does not fill the canal laterally (C).

Fig. 8 • A well filled canal is filled completely and compactly.

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Book Reviews

ORAL CANCERS AND TUMORS OF THE JAWS

By George S. Sharp, M.D., Weldon K. Bullock, M.D., and John W. Hazlet, D.D.S. 561 pages with 647 illustrations. Index. $15. New York, McGraw-Hill Book Co., 1956.

This beautifully printed and well-illustrated book is intended as a teaching text and a reference guide for practitioners. It is divided into five parts: (1) introductory principles, (2) tumors of the oral mucosa, (3) neoplasms of the jaws, (4) quasi-tumors of the jaws and (5) cysts of the jaws. There are 25 chapters, each dealing with a particular region of the body or type of tumor. In each instance, the incidence, etiology, pathology, clinical characteristics, treatment and prognosis are presented clearly and concisely.

The book is admirably planned for a quick and ready clinical reference, and the illustrations provide additional helpful guidance. Since this is primarily a clinical text to promote early recognition of cancer and precancerous lesions, the microscopic pathology is presented only briefly, and there are no illustrations of this phase of diagnosis. Roentgenological observations, however, are well illustrated.

The text should prove a useful and popular reference for the dental practitioner.

Charles W. Freeman

"THIS WON'T HURT A BIT"

By Haddon Rowat. 141 pages. Price 12s. 6d. Bristol, England. John Wright and Sons, Ltd., 1956.

Here is an unusual book with an unusual title. It contains the musings and memories of a British dental surgeon and is written in an adroit manner. The author practiced dentistry in many lands including the U.S.A., Canada, Burma, China, India, Australia, Japan, Ceylon and South Africa.

Many of the chapters are mainly anecdotal and autobiographical and cover the bad old days (when with full sanction of law and religion, anyone could practice dentistry), a glimpse of the good old days, the middling years, some observations on the National Health Service of Great Britain, unprofessional conduct, What is a good dentist?, on buying and selling practices, the need for behavior instruction to dental patients, poems of a practitioner, army dental services in retrospect, drug addicts and hallucinations under anesthetics, professional fees, dentistry in the light of recent social developments, preventive dentistry and, finally, the swan song—St. Helena Island.

Dr. Rowat has done an able job in what is, by design, a definite biography. He has balanced the elements of personal life and historical developments in dentistry. Verdict: good writing, plenty of action, worth adding to every dentist's library.

Lloyd H. Dodd

FAMILY MEDICAL COSTS AND VOLUNTARY HEALTH INSURANCE: A NATIONWIDE SURVEY

By Odin W. Anderson, Ph.D., and Jacob J. Feldman. 251 pages with 134 tables and 54 graphs. Index. $6.50. New York. McGraw-Hill Book Co., Inc., 1956.

This book contains the detailed results of a survey conducted in July 1953, in which 2,809 families were interviewed. The 8,846 individuals in these families were closely representative of the general population of the United States with respect to age, sex, income, occupation, region and so forth. The survey was conducted by the Health Information Foundation in collaboration with the National Opinion Research Center.

Most of the book deals with voluntary health insurance. The survey showed that the proportion of families with some health insurance was twice as high among families with incomes of more than $5,000 than among families with incomes of less than $3,000. In urban areas, 70 per cent of the families were enrolled in some type of health insurance, compared to 45 per cent of those living on farms.

Of most interest to dentistry is the chapter on nationwide charges for personal health services and the chapter on distribution of charges among families and individuals. Based on expenditures for dental care reported by the 2,809 families, it was estimated that $1,600,000,000 was paid for the services of dentists in the year ending at mid-1953. This figure was considerably higher than the estimates made by the American Dental Association's Bureau of Economic Research and Statistics and the U. S. Department of Commerce for 1952 which were $1,300,000,000 and $906,000,000, respectively.

A significant observation was the large difference between income groups in the percentage of persons who see the dentist. Among families with incomes of less than $2,000, only 17 per cent of the persons saw the dentist during the year, compared to 56 per cent among families with incomes of $7,500 and more.

The publication of this book has added much useful information in the field of medical and dental economics.

B. Duane Moen

DIE ZAHN-, MUND- UND KIEFER-HEILKUNDE: EIN HANDBUCH FÜR DIE ZAHNÄRZTLICHE PRAXIS (THERAPY OF THE TEETH, MOUTH AND JAWS: A MANUAL FOR DENTAL PRACTICE)

Edited by Prof. Karl Häupl, Prof. Wilhelm Meyer and Prof. Karl Schuchardt. For sale in complete set only. 650 DM. München-Berlin, Urban & Schwarzenberg, 1954-1956.

Issues 17 and 18 contain parts of volume V (Orthodontics and Dental Materials) as follows:

FIXED ORTHODONTIC APPLIANCES • By Prof. C. M. Seipel, Malmö, Sweden. 53 pages with 51 illustrations.

The author of this excellent article has long experience as a writer and teacher of orthodontics. He is internationally known. He might well be called a "teacher of teachers." His present article is divided into three chapters: (1) the principle of fixed orthodontic appliances, (2) the special dressing technic applied simultaneously with construction and insertion of fixed appliances and (3) direct dressing technic combined with fixed orthodontic appliances. Preceding the text of each chapter is a statement of purpose, and at the end is an exceptionally complete bibliography. This is an article that every orthodontist should read. Other educators in the allied dental branches would also benefit by reading it.

CLEFT PALATE IN ORTHODONTICS • By Prof. A. Martin Schwarz, Vienna, 15 pages with 11 illustrations.

This short and valuable contribution on the role orthodontics can and should play in the repair of cleft palate, by an author of international distinction is well written and profusely illustrated. The importance of this frequently neglected field is pointed out in the preface.

EXTRACTION OF TEETH FOR REGULATION OF THE ERUPTING DENTITION: THE EXTRACTION THERAPY • By Prof. A. Martin Schwarz, Vienna. 61 pages with 48 illustrations.

The fact that so many articles on serial extractions for directing and guiding tooth eruption have appeared recently in international dental literature makes it obvious that this orthodontic method has found wide acceptance. This excellent article is an interesting discussion of an important orthodontic problem. By means of lucid explanation, practical examples and a minimum of theory, the author leads his reader through a variety of experimental and statistical problems and points out not only the "how" but also the "why" of their solution. The history of this method, the biologic principles, the consequences of extraction of molars, the serial extraction technics of Kjellgren and Hotz, the esthetic aspects, and the extraction therapy in combination with orthodontic appliances are discussed in a fundamental and readable manner. Although there are more exhaustive articles on this subject, there appears to be little doubt that A. M. Schwarz's contribution is a most useful work for the orthodontist and the general practitioner. This article should be required reading also for every dental student. A bibliography of almost one thousand references completes the text.

TISSUE ALTERATIONS CAUSED BY ORTHODONTIC APPLIANCES • By Prof. Karl Häupl. 55 pages with 50 illustrations.

This contribution, intended for orientation of practicing dentists and dental students, contains an exposition of the author's theory of physiological and psychological effects of orthodontic appliances. He discusses such questions as (1) effects of favorable and unfavorable stimuli, (2) bone resorption accompanied by development of fibrous tissue, (3) periodontal tissue changes caused by application of loose, shifting passive appliances, (4) orthodontic transformation of the periodontium, (5) activation of tissue by active orthodontic appliances, (6) changes in the region of the temporomandibular joint and the jaws and (7) conclusions. At the end, the author adds a section on various forms of orthodontic treatment with a brief description of each method and his opinion as to its applicability, emphasizing particularly the treatment which combines elements of Andresen's and A. M. Schwarz's methods. Generously illustrated, this treatise can be recommended to orthodontists, practicing dentists and dental students and can serve as an excellent source of infor-

mation for speakers who may be called on to give a paper on the subject.

THE RELAPSE • By Prof. Karl Häupl. 10 pages with 2 illustrations.

This is a well-written, easily read short discussion, explaining the author's theories of failures of and relapses after orthodontic treatment. Some of his criticisms, however, are felt to be outdated and no longer valid because orthodontic practice has progressed enormously. The article is of little interest to American orthodontists because it contains nothing which is not otherwise available in American dental and orthodontic literature; the author's personal theories of his orthodontic treatment method already have been described (and translated) in previously published articles.

DENTAL MATERIALS: NONMETALLIC SUBSTANCES • By Prof. E. Dolder, Zurich. 93 pages with 72 illustrations.

This is the first of two treatises on dental materials. It covers nonmetallic substances used for inlays, fillings and dentures, including hydrocolloids and acrylic resins. The article is written in clear, uncomplicated German, the discussions are logical and informative, and the text indicates that the author has a wide acquaintance not only with materials used in German, Austrian and Swiss dental practice but also with those used in England, France and the United States. The text also emphasizes that in spite of the restrictions imposed by World War II, the writer has kept up to date on the newer discoveries. The pictures, diagrams and tables are excellent, and although the bibliography gives only nine references, the article can be recommended to dental practitioners and dental technicians as giving a clear and logical picture of the materials which it discusses.

DENTAL MATERIALS: PRECIOUS METALS • By Prof. M. Spreng, Basel, Switzerland. 69 pages with 129 illustrations (continued in issue 20).

The second part of the two treatises on dental materials contains many concepts based on recent developments in addition to the established fundamentals of the use of precious metals in medical practice. It consists of some excellent general discussions, especially on mechanical properties of dental alloys, their chemical and electrochemical characteristics, their effect in the oral cavity, their crystal structure, their homogeneous and nonhomogeneous properties, casting and preparation technics, soldering and welding technics and heat treatment (three technics). This almost complete description of dental alloys and their utilization is excellently conceived. Although there is some overlapping, the various measurements and tests are well classified. In addition, the alloys and technics are evaluated. This contribution is almost a "must" for practicing dentists and dental students who want a ready reference to the types of metals used in Europe and their value in dental practice.

Issue 19 contains parts of volume IV (Dental Prosthetics) as follows:

PARTIAL DENTURES • By Prof. Karl Häupl is concluded. This article has been reviewed previously.

STAINLESS STEEL IN DENTAL PROSTHETICS • By Julius Jantzen. 31 pages with 52 illustrations.

This article is intended to give general and precise information on the utilization of stainless steel and cobalt chrome alloys for denture construction. Their use is presented in terms of technics accepted in Europe; the article seems of little practical value to American dentists. The author is a master of his subject and presents it well to his audience of German dentists and dental technicians.

PORCELAIN IN DENTAL PROSTHETICS • By Prof. C. U. Fehr. 41 pages with 69 illustrations.

This is a rather short summary of the various technics and materials used in dental ceramics. It presents an outline of history, material selection, instrumentarium, coloring and glazing by baking, porcelain inlays, crowns and pivot teeth. The limitations imposed by the approach force a more or less didactic treatment of certain chapters, especially in the section on cavity preparation. However, the text and the excellent and numerous illustrations are a valuable compendium for the use by general practitioners and students.

Issue 20 contains parts of volume V (Orthodontics and Dental Materials) as follows:

DENTAL MATERIALS: PRECIOUS METALS • By Prof. M. Spreng. This article completes the chapter by Professor Spreng which was reviewed as part of Issue 18.

DENTAL MATERIALS: NONPRECIOUS METALS • By Prof. E. Dolder, Zurich. 25 pages with 26 illustrations.

This article deals with generalities which are too well known to be interesting. In a specialized contribution, as the title indicates this to be, the author should assume that a reader

has at least a basic understanding of the subject. The greater part of the various chapters (which are much too brief) concerns theoretical rather than practical considerations. The appendix is a repetition in summary of the text. The excellent illustrations add interest; the article itself, however, is neither textbook material nor reference data compilation.

Issue 21 contains parts of volume IV (Dental prosthetics).

THE FUNCTIONAL PROSTHETIC TREATMENT AND PREVENTION OF PERIODONTAL DISEASE AND DYSGNATHISM • By Prof. I. Rechborn-Kjennerud, Oslo, Norway. 159 pages with 148 illustrations.

This is a remarkably useful contribution which covers the subject in 22 chapters. Four chapters deal with the problems of functional prosthetic treatment of periodontal disease, the others with prevention of this disease, and management of dysgnathism (functional disturbance of the jaws). The author attempts to prove that environmental and nutritional factors affect endocrine and metabolic functions, which in turn induce constitutional changes that are responsible for many of the manifestations observed in health and disease. The result is a well-documented summary which includes, besides European authors, recent American medical and dental literature on this subject. Unfortunately, the author sometimes accepts as fact the errors which fill the literature. The consequence is a collection of material which may be of interest to the critical reader who already is acquainted with the facts but which can easily mislead the uninformed.

The value of this monumental textbook on the therapy of the teeth, mouth and jaws is greatly enhanced by the profusion of excellent illustrations, drawings, diagrams and roentgenograms.

Paul H. Glucksman

KIEFERORTHOPÄDISCHE PRAXIS (ORTHODONTIC PRACTICE)

By Hugo Stockfisch. 332 pages with 760 illustrations. Index and bibliography. 42 DM. Heidelberg, Dr. Arthur Hüthig Verlag, 1956.

As the title indicates, this book deals with orthodontic practice, recently called in Germany "orthopedics of the jaws." The various factors of hereditary and acquired conditions leading to malocclusion and malformations are analyzed, and their physiological components and psychological aspects described. The main purpose of this textbook seems to be to present in a succinct manner the symptoms, the diagnosis and, above all, the newest treatment methods and appliances in orthodontic practice. The author points out that it is essential to discuss some defects which have not been regarded as important for orthodontic diagnosis and therapy.

After a general presentation of principles underlying prevention and treatment of defective dentition in child patients, the book discusses: (1) developmental tendencies in infants and school children, (2) occlusion and malocclusion in deciduous dentition, (3) orthodontic examination, (4) orthodontic diagnosis, (5) orthodontic treatment planning and technics, (6) orthodontic instrumentarium, (7) orthodontic appliances, (8) orthodontics and oral surgery, (9) orthodontics and plastic surgery, (10) prognathism, (11) bite anomalies, (12) unfavorable habits in chewing and breathing, (13) cleft lip and palate, (14) orthodontics and speech therapy, (15) orthodontic and laboratory work, (16) orthodontic consultation and (17) orthodontic terminology.

Surprisingly, there is little difference between the German and the American terminology.

The illustrations and charts clarify and enliven the text. In addition to being a fundamental contribution, this book can be recommended for its unusual readable style, good bibliography and index, neat format and attractive binding.

Paul H. Glucksman

BIOLOGIE DER ZAHNKARIES (BIOLOGY OF DENTAL CARIES)

By T. Lammers and H. Hafner. 253 pages with 21 illustrations. Index and bibliography. 16 DM. Heidelberg, Dr. Alfred Hüthig Verlag, 1956.

This book meets the need for a well-illustrated and authoritative reference work in caries biology. Nutrition, often cited by many authorities as the most important factor in caries development, certainly is one of the major areas for caries research. Therefore, an up-to-date textbook prepared by a skillful scientist makes a noteworthy contribution. It contains a small but excellently reproduced selection of color and black and white photographs and several charts (some of them reproduced from H. Trendley Dean's writings).

The authors have written not only from the background of extensive research and clinical

experience but also with a broad outlook toward caries prevention.

The book is organized in nine main sections which deal with the following subjects: (1) caries as a biological and dental problem, (2) caries epidemiology, (3) the relationship between caries and nourishment, (4) individual susceptibility to caries, (5) carious lesions, (6) human saliva, (7) the buffering power of saliva, (8) properties of saliva and (9) caries prevention.

The authors can be commended for undertaking the difficult task of dealing with a subject matter of great complexity, in a field in which there have been differences of opinion. Excellently printed and bound, the book appears to fill a gap in dental literature.

Paul H. Glucksman

ARBEITSTAGUNG ÜBER KORTIKO-VISZERALE REGULATIONS LEIPZIG, VOM 15. BIS 17. JANUAR 1954 (SYMPOSIUM ON CORTICOVISCERAL PROCEDURES, LEIPZIG, JANUARY 15 TO 17, 1954)

By F. Jung, H. Kleinsorge and D. Müller-Hegemann. 406 pages with 133 illustrations. Index and bibliography. 22 DM. Berlin, VEB Verlag Volk und Gesundheit, 1955.

This book, published under supervision of the Governmental Pavlov Commission of the German Democratic Republic (Eastern Germany), contains 85 contributions by German, Hungarian, Polish, Rumanian and Russian authors. The symposium on corticovisceral procedures was designed primarily to establish uniform regulations in applying the theories of Ivan Petrovich Pavlov (1849-1936) to medical and dental research and practice.

Although this book was intended mainly for specialists, the interest of laymen has not been overlooked. An enormous amount of material of value has been compiled, and this book will be helpful to many students and scholars. Much of the material is new to the American reader and will acquaint the American public with the ideas of Pavlov. The contributions dealing with the problem of diagnostic technics are particularly interesting.

This compilation should prove to be of interest to many researchers in physiology and to biology students. The presentation of the subject matter is forceful, and the material is well documented. The volume has an index, and bibliographies follow each essay. Binding, paper quality, typography and illustrations, however, are below American standards.

Paul H. Glucksman

FORTSCHRITTE DER KIEFER-UND GESICHTS-CHIRUGIE: EIN JAHRBUCH, BAND II (PROGRESS IN MAXILLOFACIAL SURGERY: A YEARBOOK, VOL. 2)

By Karl Schuchardt and Martin Wassmund. 268 pages with 291 illustrations. 60 DM. Stuttgart, Georg Thieme Verlag, 1956.

This volume is a collection of papers delivered at a conference held in Hamburg in 1955. The roster of contributors includes scientists from France, Germany, Argentina and the United States and shows the international character of study and actual work.

Surgeons, plastic surgeons, neurosurgeons, oral surgeons, roentgenologists and dermatologists met to submit their methods of treatment, problems and suggested solutions.

While it is not possible to do justice to each participant in a short review, it may nevertheless be appropriate to point out some interesting features.

Some 22 lecturers covered the realm of fractures of the jaws and face and the injuries of the soft tissues and of the brain. There is some disagreement between the European and American scientists regarding treatment of fractures of the temporomandibular joint. The Europeans advocate conservative therapy, while the Americans prefer surgical treatment.

Actually, orthopedic treatment has its place everywhere, and so has surgery. Surgical procedures are especially useful in old, untreated or acute fractures. It is of value when the mandible cannot be reduced and its movements are limited or, especially in edentulous patients, where the injury is associated with multiple fractures of the lower jaw.

Good results are reported in acute fractures of the maxilla. Occlusion and facial contours are rehabilitated by the method of McIndoe, who achieved fixation of the mandible to the maxilla by immobilization of the temporomandibular joints, muscular movements, and repositioning. In arthroplasty of the joint, interposed autogenous cartilage allows the residual condylar neck or ramus to act as fulcrum, while the earlier use of fascia results in an open bite or retrusion.

Ten speakers discuss the modern treatment of facial palsy, a treatment still far from satisfactory. The nerve grafting operations, by uniting either the accessory nerve or the hypoglossal nerve with the peripheral ends of the facial nerve, may result in limitation of the shoulder movements or speech disorders.

The muscle-nerve transposition technic also has drawbacks. Plastic surgery is recommended for favorable cosmetic results in such instances

as face and eyelid lifting, and excision of the superfluous skin around the nasolabial fold.

The Argentine school secures operative results by resection of certain muscles on the normal side of the face in order to eliminate their excessive contraction. Suspension with fascia strips improves the function of the normal muscles.

Seven surgeons survey reconstruction of the external ear. Costal cartilage is used to support the auricle. Artificial ears are made of plastic compounds and retained by implanting subperiosteal castings underneath the skin. There is an interesting article on the origin of the tube pedicle flap operation first executed by Italian plastic surgeons of the sixteenth century.

The rest of the book is devoted to open bite operations and to treatment of lymphangiomas and hemangiomas. Technics are outlined for repair of malformations or defects of the midface in which grafts are implanted through the mouth.

Excellent pictures in color show neutralization of color in nevus flammeus by intradermal injections of permanent pigments. The discussion of prophylactic neck dissection in cancer of the maxilla treated by radical operation and irradiation with radioactive cobalt is interesting. The illustrations are excellent. The didactic style of the book makes it an admirable addition to the literature of jaw and face surgery.

Eugene Schorr

ZAHN- UND KIEFERERSATZ BEI KINDERN (ARTIFICIAL DENTURES AND JAW CORRECTION IN CHILD PATIENTS)

By L. V. Iljina-Markosjan. Translated from the Russian into German by B. Kessler. 158 pages with 184 illustrations. Index and bibliography. 16.50 DM. Leipzig, Johannes Ambrosius Barth Verlag, 1956.

The result of repeated, painstaking evaluation of several decades of Russian research, this work has achieved a concreteness, completeness and precision which, unfortunately, is lacking in most of the dental textbooks arriving in the United States from countries behind the Iron Curtain.

The volume deserves close study not only by dentists and orthodontists but by American textbook writers. Although there is no lack of theoretical background needed for compiling essential facts, the emphasis in this comparatively small paper-bound book is on the technics of obtaining normal function in all regions of the oral cavity in child patients. This emphasis is shared by American dentists in their practice and philosophy.

This book also is proof that a scientist, permitted to devote himself to research without supervision by the government, can achieve important results.

The introduction contains a broad review of the aspects of dental prosthetics. The book is divided into the following sections: (1) causes of premature tooth loss, (2) development of dental arches, (3) designing and constructing of special dentures for children, (4) physiological and psychological effects of new dentures, (5) prevention and treatment of malocclusion and (6) relation between rickets and development of the teeth and the jaws.

An accurate and well-arranged bibliography mainly of Russian and German references (no American author is listed) and an index complete the book.

This work presents a comprehensive, clear introduction to Russian pedodontics of today.

Paul H. Glucksman

DER ARZNEIPFLANZEN- UND DROGENSCHATZ CHINAS UND DIE BEDEUTUNG DES PEN-TS'AO KANG-MU ALS STANDARDWERK DER CHINESISCHEN MATERIA MEDICA (CHINA'S MEDICINAL PLANTS AND DRUGS AND THE IMPORTANCE OF THE PEN-TS'AO KANG-MU, THE CHINESE STANDARD WORK ON PHARMACOLOGY)

By Alfred Mosig and Gottfried Schramm. 72 pages with 5 illustrations. Index. 2.70 DM. Berlin, VEB Verlag Volk und Gesundheit, 1955.

This booklet is intended primarily for students of pharmacology, especially those who are interested in drugs used in ancient and modern China. The reader's attention is focused on both their action and use in Chinese medical and dental practice.

In addition, the German authors report on the peculiar standards of the Chinese healing arts, the management of Chinese pharmacies, the quality of Chinese ancient and modern medical and dental literature, the variety of medicinal plants, Chinese medical and dental terminology, and finally on peculiar drugs obtained from animals and minerals.

Although inadequately bound it is well printed and can be recommended as interesting collateral reading on this special subject.

Paul H. Glucksman

ZAHNÄRZTLICHE CHIRURGIE, BAND II
(OPERATIVE DENTISTRY, VOLUME II)

By Josef Andreas Köhler. 297 pages with 672 illustrations. Index. 34 DM. Heidelberg, Dr. Alfred Hüthig Verlag, 1956.

This book is a presentation of seven important subjects in dentistry—replantation, cysts, suppuration in the oral cavity, radical surgery in regions of the periodontium and the alveolar process, plastic surgery and neuralgias causing oral symptoms—and is based on the author's previously published first volume.

The book, written in typical, scientific German, is a brilliant example of the printer's and lithographer's art. Most of the illustrations are excellently reproduced.

This second volume of the German standard work on operative dentistry is not large but in its 297 pages are excellent discussions of some important dental and surgical points often missing in other textbooks.

The appendix, operative dentistry in its relation to the other specialized branches of dentistry, covers with startling brevity the subject of the cooperation necessary between dental specialists, the characteristics of surgery within dentistry, and the organization of offices and hospital wards.

Both volumes of this textbook should be useful to those American dentists capable of reading German, but even with a trifling knowledge of this language, the content or, at least, most of it, can be understood if one remembers some school Latin.

Paul H. Glucksman

HEALTH INSURANCE: WHAT ARE THE ISSUES?

By The Canadian Welfare Council. 60 pages. Appendix. $1. Ottawa, Canadian Welfare Council, 1956.

This well-organized and well-written compendium on the subject of health insurance is designed to clarify the issues involved in a national health insurance program rather than to recommend any particular plan for adoption by the Canadian people.

In the first five chapters such terms as costs of medical care, personal medical care, health insurance, hospital insurance and nation-wide health plan are briefly explained. Considerable space is devoted to social, economic and geographic conditions affecting the amount, quality and distribution of health and hospital services and which reflect the need for national intervention in providing adequate services to all regardless of age, income or place of residence. Nongovernmental plans such as Blue Cross and medical care plans are discussed. A description is provided of governmental services in the various provinces which range from limited to full medical and hospital care for certain groups. These attempts to provide necessary services would seem to emphasize popular interest and the desire for a comprehensive national program.

The last five chapters develop the theme of a national comprehensive health insurance plan based on the criteria of payment by the individual in accord with ability, coverage of the major costs of medical care and inclusion of the entire population. Financing the costs of comprehensive health care is discussed with suggestions as to sources of funds, (personal contribution, industrial and general taxation), methods of collection and control of the program. Administration and organization of the plan, with "staging" or expansion by degrees, concludes the text. Expansion would include dental care among other benefits.

Fourteen pages of appendix state the favorable attitude of the Canadian government toward national health insurance, describe health insurance in Great Britain, New Zealand and Scandinavia, provide data to supplement the theme of the text, and bibliography. *Health Insurance* is recommended to those interested in the subject.

D. W. Brock

APPLIED ORTHODONTICS

By James David McCoy, M.S., D.D.S., and Earl Emanuel Shepard, D.D.S. Seventh edition. 336 pages with 212 illustrations. Index. $7.50. Philadelphia, Lea & Febiger, 1956.

In this seventh edition, Dr. McCoy provides again a scholarly revision of his text for all students of orthodontics. Its value, however, is not limited to the beginner, for the experienced orthodontist will find in the book a comprehensive review of the fundamental knowledge on which the specialty is based.

Chapters are included on growth and development, etiology, classification, diagnosis and the anatomic factors controlling normal occlusion or contributing to malocclusion in the dentofacial region. One chapter is devoted to a complete discussion of Albin Oppenheim's classic work on the tissue changes which make possible the movement of teeth.

Excellent chapters are provided to describe pretreatment requirements. One is devoted to the gnathostatic impression technic for accurately oriented plaster models. Another considers in detail roentgenographic aids in case analysis. The author stresses the importance

of adequate photographic records in arriving at a complete diagnosis.

A warning note is given in a discussion of extraction compromises for the correction of severe irregularities. In issuing his warning, Dr. McCoy speaks from an experience of 50 years in the private practice of orthodontics, during 27 of which he was also an instructor and professor of orthodontics at the University of Southern California.

The appliances currently used in treatment procedures are described in the chapters on the correction of dental and oral anomalies; particular emphasis is placed on the mechanics involved in the application of the McCoy open tube appliance. The book is excellently illustrated, and the type is clear and readable. Dr. McCoy's long-standing interest in proper orthodontic terminology and nomenclature is evident throughout the text.

For the first time, the revision was undertaken in collaboration with another author—Earl E. Shepard, professor of orthodontics at Washington University, St. Louis, and assistant editor of the *American Journal of Orthodontics*. Full credit is given Dr. Shepard for his capable contributions in the preparation of this seventh edition of *Applied Orthodontics*.

B. F. Dewel

DICTIONARY OF DIETETICS

By Rhoda Ellis, Ph.D. 152 pages. $6.00. New York, Philosophical Library, 1956.

The *Dictionary of Dietetics* is a compilation of terms related to diet and diet therapy. In some instances only a definition is given, in others, comments relating to the subject are included. Usually within the dietetic field, the comments and definitions are good, although occasionally some meanings are not clear because important words have been omitted.

A number of definitions and comments in fields other than dietetics should have been checked more carefully by someone with specialized training. There are a number of ambiguous and inaccurate statements relating to dentistry; such as, "Dentine: the hard dense calcified substance surrounding the pulp cavity of a tooth, affixed by cementum," "Caries, dental: a cavity caused by mouth bacteria bringing about gradual decay and excavation of dentine of the tooth," "Diet, dental: Diet in which texture of the food is of primary consideration because of the problem of dentures," "Periodontal disease: a disease surrounding a tooth."

Even some sections relating specifically to diet could have been made clearer. An example is the section on pastry. The order in which the details are arranged certainly would give most readers an erroneous idea of the true caloric values of various kinds of pie and do not make clear that "pastry" is being used in the limited meaning of "crust" only.

This kind of book has great potential value because of its comprehensive coverage, but this particular volume would be more dependable for everyone if a number of terms were carefully revised.

Dorothea F. Radusch

APPLIED DENTAL MATERIALS

By John N. Anderson, B.D.S. 422 pages with 31 illustrations. Index. English edition, 37s. 6d. Oxford, Blackwell Scientific Publications, 1956. U.S. edition, Springfield, Ill., Charles C Thomas, 1956.

The author writes, "This book . . . is intended as a guide to the everyday manipulation of materials, rather than a scientific treatise upon their properties. It is intended both as a textbook for students, and also as a reference book to which dental practitioners and their technicians will turn . . ." Certainly, the author has attained his objective, since a number of technics are described which are not ordinarily employed in the American dentist's office but with which he should be familiar.

For example, a chapter on the chrome-cobalt alloys presents for the first time in the dental literature a complete account of the technical procedures employed in the casting of partial dentures, together with the theory involved. Each step of the procedure is explained. This particular type of alloy is too often neglected in the teaching of dental materials in the United States.

The book is divided into five sections, each of which deals with a specific phase of the subject.

All of the general phases of the subject of dental materials are covered, including general properties of materials, cast and wrought metals, casting technics, plaster, stone, impression materials, acrylic resins, dental cements and dental amalgams. The main approach is British, but there are few sections which cannot be applied to American dentistry as well.

The academic or basic science aspects of the subject are related to the practical phases, but it is evident that the author is better versed in the technical phases than in some of the background theory.

The book is printed in an easily read type. The illustrations are mainly line drawings

not too carefully selected. More illustrative material would enhance the value of the book, particularly as a textbook.

An extensive bibliography of source material is appended. The references have been carefully selected, and both the English and the American literature is covered. A list of selected physical tables is included.

This book is definitely recommended as a part of the required reading in courses in dental materials, and it would be a valuable addition to the professional library of any practicing dentist.

Eugene W. Skinner

HEALTH OBSERVATION OF SCHOOL CHILDREN

By George M. Wheatley, M.D., M.P.H., and Grace T. Hallock. Second edition. 488 pages with illustrations. Index. $6.50. New York, The Blakiston Division, McGraw-Hill Book Co., Inc., 1956.

Numerous improvements and additions have been made in this edition of a volume that appears to have become well established as a valuable aid to teachers, parents and all others who have direct relationships with children. With the help of the simple yet complete discussions of all aspects of child health and development, such persons will be well prepared to detect deviations from normal, to provide significant guidance on health matters for children and to inculcate positive attitudes regarding health.

This new volume follows the same general organization as earlier editions, with chapters on general child health problems, growth, mental attitudes, the heart, lungs, gastrointestinal tract, skin and special senses. The final chapter considers bones and muscles, their importance in growth and posture and disorders that may affect them. There is extensive discussion of the teeth in the chapter on gastrointestinal functions, as well as material on speech problems that may result from tooth defects.

Usefulness of the book as a working tool is enhanced by the inclusion of a list of national organizations working in health education. Suggestions about visual aids for each chapter are contained in an appendix, with a selected list of film sources. At the end of each chapter there are provocative questions based on the subject material, suggested activities and a bibliography.

Many chapters contain new material or have been extensively revised. The polio situation has been brought up to date, and there is an illustrated discussion of the newer method of artificial respiration. Also included is new material on the problem of influenza immunization.

This volume undoubtedly will be as well received as was the first edition.

William W. Bolton

L'INSTITUT DE MEDÉCINE DENTAIRE DE L'UNIVERSITÉ DE GENÈVE, 1881-1956 (THE DENTAL INSTITUTE OF THE UNIVERSITY OF GENEVA FROM 1881 TO 1956)

Edited by A. J. Held. 104 pages with 125 illustrations. Zurich, Verlag Berichthaus, 1956.

Detailed accounts of the activities of a dental school celebrating an important anniversary have become extremely popular with the dental profession. Some of these reports provide little more than abstracts of lectures and dissertations; others, however, give an excellent description of recent achievements in dental research and education and include critical analyses of the work done during the period reviewed. The value of such a report depends largely on the ability of the editor and the standards of the contributors.

The Dental Institute of the University of Geneva, Switzerland, one of the oldest European dental schools, recently celebrated its seventy-fifth anniversary.

Prof. A. J. Held, its present head, has issued an account of the various branches of dentistry in which the Institute is actively interested. The contributors, members of the university staff, have been well selected, and the combined result of their work makes this report an interesting publication for the dental profession, especially for staff members of American dental schools.

This comparatively small, paper-bound booklet provides a critical assessment of the excellent, educational work accomplished at the dental school in Geneva and avoids the danger of being a "cookbook of dental education."

Although the book is written in French, it will be understood easily because each contribution is accompanied by summaries in English and German.

Illustrations are plentiful and excellent; the type could be larger, the binding better, and an index and a bibliography added but, of course, this would mean additional expenses that the Institute obviously could not meet.

Paul H. Glucksman

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, QUERIES AND MINOR NOTES

334 pages. $5.50. St. Louis, C. V. Mosby Co., 1956.

The keen interest displayed in the question and answer section of the *Journal of the American Medical Association* is certainly a good reason for systematizing the heterogeneous questions according to the medical concepts of 1955. The material is organized in terms of the body as a whole and into the various systems and organs of the body. The purpose is to present the views of experts on controversial issues not found in standard textbooks or monographs.

The dentist will find these questions representative of many encountered in everyday dental and medical practice. This collection thus constitutes a valuable reference guide.

I. Newton Kugelmass

IN THE DOCTOR'S OFFICE—THE ART OF THE MEDICAL ASSISTANT

By Esther Jane Parsons. Second edition. 326 pages with illustrations. Index. $3.95. Philadelphia, J. B. Lippincott Co., 1956.

The material in this book, written by a former medical assistant and teacher of assistants, is presented in a somewhat different manner than in most books of its kind. It should appeal to the graduate nurse as well as to the person with secretarial training who seeks employment in the doctor's office.

Its 16 chapters adequately cover all the duties of a medical assistant. No attempt has been made to instruct the reader in the technical aspects of medical assisting as it is assumed that those who use this book will have had such training. However, its chapter "In The Treatment Room" provides technical information that can be reviewed to good advantage.

A chapter "The Sum of What You Are" which discusses personality, dress, cosmetics and coiffure, carriage and posture, and character offers information which this reviewer feels is too frequently overlooked by many writers of books intended to assist persons rendering health services.

Illustrations at the beginning of each chapter, cleverly done by Jean McConnell, inject a note of humor and add reader interest to the topics discussed. Although some might feel that this manner of instruction is lacking in professional dignity, the reviewer believes the everyday business of dealing with patients in the doctor's office can be approached with advantage from a down to earth attitude. There is a lesson in each illustration, and the information in the chapters should provide the answers to many questions that the medical assistant has probably failed to find in books of a more technical nature.

The type is large and readable. Although the paper and binding are adequate, improvement of both might enhance the value of the book.

Violet L. Crowley

DISEASES OF THE SKIN

By Richard L. Sutton. Eleventh edition. 1,479 pages with 1,972 illustrations. Index. $29.50. St. Louis, The C. V. Mosby Co., 1956.

This beautifully arranged and extremely comprehensive eleventh edition of a volume that has long enjoyed a superior rating comes up to all expectations. Timeliness of the volume is emphasized by the editor's comment to the effect that it has been modernized throughout up to the time galley proofs were read. Since the previous edition was published in 1939, extensive revision was required in many sections.

Thanks to the illustrations, of which there are 1,972, the text is especially well explained. There is a tremendous amount of material that will be invaluable to the dentist, including illustrated discussions of diseases of the mouth, teeth, lips and gingiva. This material is found in a 362 page chapter on malformations and neoplasms of the skin and adjoining mucosa, in another 946 page chapter on diseases affecting the mucosa adjoining the skin and in various other chapters in which disorders due to specific causes are considered.

There is an extensive index, with appropriate cross references, that facilitates search for specific discussions.

After chapters on anatomy, embryology, physiology, symptomatology and pathology, etiology and diagnosis, there is one on general treatment procedures in which special agents are considered. Then follow several chapters on dermatoses due to various specific agents, including chemicals, viruses, bacteria, fungi, metabolic and vascular disorders.

In this volume has been assembled all the technical information necessary for understanding and management of dermatologic conditions. These are emphasized in proportion to their incidence. Evaluation of specific treatment procedures is thorough and decisive.

William W. Bolton

Current Literature

JOURNAL OF DENTAL RESEARCH
October 1956

MEASUREMENT OF STRESS IN MASTICATION. I.

D. J. Anderson, p. 664.

The method of recording masticatory stresses previously described by the author (J. D. Res. 32:785 Dec. 1953) has been used on four subjects chewing biscuit, raw carrot and meat. The results, expressed in kilograms per square millimeter of recording surface and the mean maximum pressures, varied between 0.40 and 1.75 Kg. per square millimeter. Total pressures and the number of chewing thrusts per sequence were determined. With all materials, one subject consistently showed greater total pressures per chewing sequence than the others. However, no pattern of behavior emerges either in pressure or the number of chewing thrusts per sequence which might be related to the nature of the food being chewed.

MEASUREMENT OF STRESS IN MASTICATION. II.

D. J. Anderson, p. 671.

Calibration technic for the method of recording masticatory stresses with resistance wire strain gauges has been modified to allow the determination of vertical loads on the whole tooth. Calibration is carried out with the strain gauge apparatus in a metal model of the tooth which has been accurately articulated with its opposite tooth.

This modification has so far been applied to two subjects, and the mean maximum whole tooth loads varied between 7.2 and 14.9 Kg. when biscuit, carrot and meat were the foods chewed.

CONGENITAL DENTOFACIAL MALFORMATIONS IN RATS INDUCED BY MATERNAL NUTRITIONAL DEFICIENCY

Frederick M. Deuschle and Josef Warkany, p. 674.

This study is an analysis of the dentofacial changes in newborn rats, changes attributable to maternal riboflavin deficiency.

The resulting malrelationships and "malocclusions" have been evaluated by cephalometric methods. It was found that the various facial angles were not equally affected by a changed prenatal chemical environment and that different parts of the facial skeleton were retarded disproportionately. Since the corpus of the mandible was more reduced than the maxilla, prerequisites for malocclusion were present.

THE PATHOGENESIS OF ABNORMAL ENAMEL FORMATION IN RABBITS INOCULATED WITH VACCINIA

Seymour J. Kreshover and James A. Hancock, Jr., p. 685.

Considerable developmental dental defects may be noted in rabbits that have been infected with vaccinia virus. In an attempt to clarify the pathogenesis of such disturbances, eruption rates, as well as a number of calcium and phosphorus determinations, were recorded for eight control rabbits, six recently inoculated and four grossly hypoplastic rabbits. It was observed that eruption is significantly slowed after inoculation and is even more retarded at the time hypoplastic lesions appear on the crowns. No significant departures from control levels were noted in the blood serum calcium and phosphorus readings of either experimental group.

Although the dental abnormalities following vaccinia inoculation are quite like those described in rats on which parathyroidectomy and hypophysectomy have been performed and in magnesium-deficient rats, it is difficult to conceive of a common denominator to explain the pathogenesis in all instances. Nevertheless, in all these different situations there is a retarded rate of eruption, which seems to be the principle mechanism by which the wavelike apical deformities are produced.

THE EFFECTS OF ALUMINUM OXIDE ON THE LUNGS OF MICE

Charles A. Clark, p. 693.

A STUDY OF INFERIOR ALVEOLAR NERVE BLOCK ANESTHESIA IN HUMANS COMPARING 2.0 PER CENT PROCAINE WITH 2.0 PER CENT PROCAINE PLUS 1:50,000 EPINEPHRINE

Emmett R. Costich, p. 696.

There have been statements in the literature to the effect that nerve blocks with procaine containing no vasoconstrictor would give anes-

thesia of sufficient depth and duration for dental operations. To evaluate this opinion, 50 medical students served as experimental subjects and received right inferior alveolar nerve blocks. Each subject received five injections at weekly intervals. The first injection was disregarded in tabulating data; and of the remaining four, two injections of procaine-epinephrine and two of procaine were used. The students were observed for changes in pulse rate, blood pressure, pulse pressure, respiratory rate; sign of tremor, sweating, and faintness; and onset, duration and quality of anesthesia and postanesthetic pain. Procaine-epinephrine injection resulted in the following statistically significant differences as compared to procaine: (1) drop in postinjection diastolic blood pressure, (2) longer duration of anesthesia, (3) increased number of untoward reactions, (4) more desirable depth of anesthesia.

THE INFLUENCE OF DESIGN FACTORS IN THE PERFORMANCE OF THE INVERTED CONE BUR

E. E. Henry, p. 704.

The advent of cavity-shaping technics which utilize high rotational speeds and a light hand pressure to remove a large amount of tooth material has resulted in an acute awareness on the part of dental operators that certain burs are superior to others. This report is a partial result of a program to determine the influence of various design factors on the performance of dental burs. Specifically, the purpose of this program is to study the effect of six variables on the cutting ability of the no. 37 bur. These variables are: (1) the finish, (2) heat treatment, (3) end flutes, (4) changes in bur diameter, (5) changes in length of engagement and (6) changes in the number of flutes. The results are shown graphically in terms of the average linear displacement per flute revolution, which is equivalent to the average distance that the bur advances into the cut per flute revolution. It was found that only the last one-thousandth of an inch of flute edge is effective for cutting a soft material. This distance decreases as the material hardness increases until, in some instances, only a few micro-inches of blade edge are effective.

HISTOGENESIS AND HISTOCHEMISTRY OF PULPAL CALCIFICATIONS

P. L. Johnson and G. Bevelander, p. 714.

A study of pulpal calcification in the human tooth was made. Denticles arose from a nidus of cells. Subsequently, reticular fibers surrounded the cells. Then calcification of the first formed matrix occurred. At the same time, additional matrix was laid down peripherally. Extensive calcification of pulp horns, sometimes observed, resulted from the fusion of several denticles. Areas of diffuse calcification were observed, chiefly in the root canals. They first appeared as minute spheres which underwent enlargement as a result of fusion of neighboring centers.

Like the denticles, these structures had an organic matrix composed of reticular fibers and a ground substance. A complex consisting of reticular fibers and a ground substance containing mucoprotein and metachromatic material was observed in denticles and diffuse calcifications. Unlike developing bones and teeth, however, no indication of alkaline phosphatase, glycogen or nucleic acid was observed in any cells or tissues associated with these calcifying regions.

ACCOMMODATION OF NORMAL AND PATHOLOGIC PULP NERVES

Fernando Vargas F., p. 723.

Nerve accommodation was measured in 20 normal and 15 abnormal teeth by the use of one rectangular impulse and seven exponentially increasing currents with time-constants between 4.85 and 42.5 milliseconds. In normal teeth, the slope of accommodation was 0.164 rheobase per millisecond. This value is higher than values obtained in other human tissues. In pathologic teeth, the slope of accommodation decreases to 0.048 rheobases per millisecond. The difference between the two groups is statistically significant ($P<0.001$). Since accommodation is a linear function in normal and pathologic pulp nerves, it is possible to measure accommodation by means of only two different stimuli of known time-constants. This procedure represents a simplified method to test excitability of pulp nerves. The great difference of the slope of accommodation between normal and pathologic teeth enhances the possibility of using this method in dental electrodiagnosis.

DENTAL CONDITIONS AMONG THE POLYNESIANS OF PUKAPUKA: II. THE PREVALENCE OF PERIODONTAL DISEASE

G. N. Davies, p. 734.

This report is the second of a series covering the results of a dental survey of the natives living on a remote Pacific atoll. Of 497 subjects examined, 45 per cent were affected to a greater or lesser extent by periodontal disease.

Of the 225 patients with periodontal disease, 62 had mild gingivitis (Grade 1), 68 had moderate gingivitis (Grade 2), 40 had severe gingivitis (Grade 3) and 55 had severe gingivitis with associated generalized periodontitis (Grade 4). There was no significant difference in the prevalence of periodontal disease between men and women.

A strong association was found between the prevalence of periodontal disease and increasing age. Children under ten years of age were rarely affected, whereas 92 per cent of adults over 41 years of age were affected. Occlusal trauma, food impaction and premature wear of teeth were found to be associated with periodontal disease in 34.6, 9.7 and 8 per cent of the subjects, respectively. There was significant association between the degrees of periodontal involvement and the extent of both supragingival and subgingival calculus formation.

A significant association was found between high erythrocyte sedimentation rates and severe periodontal disease and also between high serum protein values and severe periodontitis. A negative association was found to exist between leukocyte counts and severe periodontal disease. The possible influence of vitamin A and C deficiencies as predisposing factors is mentioned.

CHEMICAL ANALYSIS OF HUMAN TEETH

Kamal Asgar, p. 742.

STUDY OF TIN IN ENAMEL

Finn Brudevold and Luville T. Steadman, p. 749.

The concentration of tin in successively ground layers of enamel has been determined spectrographically for groups of unerupted and erupted teeth of different ages.

The amount in unerupted teeth is about 1 ppm and is evenly distributed with depth.

In erupted intact teeth of 50 years of age, the outermost layer has only 7 ppm, an amount indicating no significant posteruptive uptake. The tin in the external layer of teeth with amalgam restorations, however, increases from 20 to 80 ppm as the person grows older.

ESTIMATION OF THE CHLORIDE LEVEL OF SALIVA

John T. Anders, p. 753.

A method for measuring the chloride ion concentration of the saliva and a method for classification of subjects according to the DMF index have been presented. On the basis of the study of 251 subjects, a significant difference was found to exist between the chloride level of the caries-free group and that of the group with most extensive and rapid carious breakdown. The possible implications of the presence of the chloride ion in the saliva are discussed, and it is suggested that there may be a connection between the presence of the ion and the amylase activity of saliva.

URINARY FLUORINE LEVELS IN CHILDREN FOLLOWING THE CLINICAL USE OF A STANNOUS FLUORIDE-CONTAINING DENTIFRICE

Richard A. Schweinsberger and Joseph C. Muhler, p. 760.

The routine use of a stannous fluoride-containing dentifrice (1,000 mg./Gm. of fluoride) did not significantly increase the urinary fluorine level in a group of children over the level of a similar group of children using an identical dentifrice not containing fluoride. When the children using the stannous fluoride dentifrice are compared with a similar group of children residing in a natural fluoride area, there is 300 per cent less fluorine in the urine of the former group.

EFFECT OF VARIOUS CONCENTRATIONS OF SODIUM FLUORIDE ON PARASITIC AND FREE-LIVING PROTOZOA AND ROTIFERA

Wayne W. Wantland, p. 763.

Parasitic protozoa in the intestinal tract of golden hamsters are diminished when the host is given *ad libitum* 2 to 10,000 ppm of sodium fluoride in drinking water. These parasites disappear from the intestine of hamsters when higher concentrations of sodium fluoride (0.5 cc., 500 to 10,000 ppm) are administered by stomach tube daily for five days.

In vitro experiments indicate a strong resistance of these parasitic protozoa to 2 to 100 ppm of sodium fluoride. On microscopic slides, concentrations of 500 to 10,000 ppm of sodium fluoride prove lethal to these parasites in from 10 to 40 minutes. Free-living protozoa (Paramecium and Euglena) and fresh water forms of Rotifera continue to be alive and active when placed in sodium fluoride concentrations of 2 to 1,000 ppm but are killed rather quickly when placed in concentrations of 1,700 to 10,000 ppm. A biologic test which uses forms of Rotifera and Paramecium as test organisms and a modification of the Hellige fluoride reagent no. 611-S751 (MHR) has been devised. It requires two hours to complete and accurately differentiates

between water containing 10 ppm of sodium fluoride (4.5 ppm fluoride ion) or less and water containing 20 ppm of sodium fluoride (9.5 ppm fluoride ion) or more. Data presented (1) provide strong evidence against the idea still prevalent in many places that fluoride is a highly toxic protoplasmic poison even in low concentrations, and (2) further promote testing procedures for confirming amounts of fluorine added to water, which should allay the fears of the most critical and apprehensive individuals.

X-RAY STUDY OF FLUORAPATITE FORMATION DURING THE FLUORIDE TREATMENT OF POWDERED DENTAL ENAMEL

Robert B. Fischer, Charles E. Ring and Joseph C. Muhler, p. 773.

Two roentgenographic methods are described for the direct determination of whether an apatite sample is dominantly hydroxyapatite or dominantly fluorapatite. In one, conventional powder diffraction technics are used with particular attention to sample mounting and collimation. In the other, a curved crystal monochromator is used. Samples of enamel treated with fluoride reagents reveal that, under the conditions used, fluorapatite is not the dominant product in the treatment of enamel with fluorides.

THE FORMATION OF LACTIC ACID IN DENTAL PLAQUES. I. CARIES-ACTIVE INDIVIDUALS

B. W. Moore, William J. Carter, J. K. Dunn and L. S. Fosdick, p. 778.

The pH and lactate concentration of dental plaques before and at intervals after a 50 per cent sugar rinse were measured. It was found that the increase in lactate content of the material followed very closely the increase in hydrogen ion concentration. On the basis of titration curves of dental plaques, it was concluded that all or nearly all of the observed decrease in pH could be accounted for by the increase in lactate.

THE FORMATION OF LACTIC ACID IN DENTAL PLAQUES. II. ORAL CONDITIONS OF PRIMITIVE BUSHMEN OF THE WESTERN KALAHARI DESERT

A. J. Clement, R. Plotkin and L. S. Fosdick, p. 786.

Fifty primitive Bushmen were secured, and the oral conditions of these individuals were observed. In addition to a clinical examination, the pH and lactate before and after a 50 per cent sugar rinse were measured. It was found that the African Bushmen are caries-inactive. In no instance did the pH of the plaques drop below 5.5 after a sugar rinse. The possible causes of the observed oral conditions are discussed.

THE FORMATION OF LACTIC ACID IN DENTAL PLAQUES. III. CARIES-IMMUNE INDIVIDUALS

Harold R. Englander, William J. Carter and Leonard S. Fosdick, p. 792.

Fifty-one caries-free individuals were found after screening 50,000 Navy recruits. The pH and lactate content of dental plaques were measured before and after a sucrose rinse. In no instance did the pH drop below 5.5. The lactate concentration was in general about half that found in the plaques of caries-active individuals. The analytical results of caries-active individuals, African Bushmen, and caries-immune individuals were compared and discussed.

THE RELATIVE EFFICIENCY OF TWO SELECTIVE MEDIA FOR THE ISOLATION OF LATOBACILLUS SPECIES FROM THE MOUTH

G. Charlton and H. C. Spies, p. 800.

Two selective media, Rogosa S.L. agar and Kulp-Hadley tomato-peptone agar, have been examined with respect to their relative efficiency for the isolation of lactobacillus species from the mouth.

From this work it may be concluded that Rogosa S.L. agar is more selective for oral lactobacilli than the tomato-peptone agar and that, as similar numbers of lactobacilli can be recovered from saliva samples, it is a suitable medium for use in routine lactobacillus counts.

OBSERVATIONS OF HUNTER-SCHREGER BANDS

J. F. Mortell, Jr., and F. A. Peyton, p. 804.

Because of the need for a better understanding of the physical arrangement of the enamel rods in human tooth enamel, this examination of the Hunter-Schreger bands was undertaken. A method for examining Hunter-Schreger bands by means of a shadowed replica technic and shadowed tooth sections was employed. Throughout the study, it was observed that the replica method was sensitive for the study of Hunter-Schreger bands.

Although areas on replicas were readily found where Hunter-Schreger bands corresponded to parazones and diazones, these bands often were observed in areas where no change in rod direction was apparent. Thus, it would appear that an explanation of the Hunter-Schreger bands entirely on the basis of changes in direction of the rods may be an oversimplification. In general, the dark bands in the replicas examined displayed more detailed structure than the light bands. The contrast between the light and dark bands in regard to structure, discernible within the rod sheath, was striking.

Three morphologic characteristics of Hunter-Schreger bands appear evident from this study: (1) The bands are revealed to extend from the dentinoenamel junction to the periphery of the enamel in many teeth when examined by the shadowed replica method; (2) the bands form concentric arcs in the cuspal areas, as a characteristic formation; (3) the Hunter-Schreger bands may be observed in areas of the enamel where change in rod direction is not apparent.

THE PIN CLAMP AS A BONE STOP

H. L. Hubinger. J. Oral Surg. 14:284 Oct. 1956.

In gunshot fractures of the mandible, the Roger Anderson pin clamps are used as bone stops on large gauge Kirschner wire to maintain bone fragments in their normal position. The large gauge Kirschner wire with its spade-shaped pointed end is easily driven with a hand drill through the bone of the mandible. By immobilization of the fragments in this manner, the viable comminuted bone is allowed to form a matrix for eventual bony union.

MANAGEMENT OF MEDICAL AND ANESTHETIC EMERGENCIES IN ORAL SURGERY

Glenn J. Potter, M.D. J. Oral Surg. 14:301 Oct. 1956.

Emergencies occur because of predisposition in the patient and untoward results of ministrations by the surgeon and anesthetist. A good code of procedure will prevent most emergencies and assure a better response when they occur. History taking and physical examination aid in prevention and proper management. Poor risks require hospitalization and consultation with the internist.

Diabetic patients are given glucose and saline infusions with insulin. Hypothyroidism requires that light anesthesia be used, whereas thyrotoxic patients need sedation and potent anesthetic agents if anoxia is to be avoided.

Local anesthetic convulsions are controlled with intravenous thiopental sodium or other agents, after which resuscitation employing 100 per cent oxygen must be carried out. Hyperthermia may be lessened by ice packs, hydration and light draping of patients.

Overdosing with opiates and anesthetic agents causes respiratory depression and should be avoided. Analeptics have less value than artificial respiration with oxygen. Each type of respiratory obstruction requires separate management, including use of artificial airways, aspiration and employment of dependent drainage.

Alteration in blood pressure and cardiac rhythm must be treated with appropriate drugs and other measures. Adrenal cortical hormone is given intravenously to some patients with intractable shock. Meperidine, tourniquets and oxygen with positive pressure are employed for acute pulmonary edema.

Good anesthetic management with avoidance of anoxia prevents cardiac arrest. If cardiac arrest occurs, immediate thoracotomy, with rhythmic cardiac compression and other measures, is required.

Vomiting under anesthesia is reduced by preoperative abstinence from food and by maintenance of an adequate level of anesthesia. If the stomach is inflated by the anesthetist, it should be immediately decompressed by passage of a large rubber tube.

Care is required in venipuncture to adjust the needle point centrally in the vein, thus avoiding extravasation.

TREATMENT OF MAXILLARY AND MALAR FRACTURES: REPORT OF CASE

Paul E. Jurgens. J. Oral Surg. 14:339 Oct. 1956.

A 30 year old man was admitted to the hospital with multiple lacerations of the head and legs, loss of some maxillary and mandibular teeth and fracture of the maxillary and left zygomatic bones. Tetanus toxoid and antibiotics had been administered prior to his admission, and all lacerations had been sutured.

Characteristic signs of a fractured zygoma were present. These signs included: periorbital ecchymosis, visible depression in the fractured region, anesthesia over the distribution of the left infraorbital nerve, pain in the left coronoid

process on movement of the mandible, and depression of the region on digital examination. The maxillary fracture was proved with intraoral and digital examinations. Multiple head roentgenograms further confirmed the diagnosis.

The remaining physical examination and laboratory studies were essentially negative.

Treatment consisted of open reduction of the fractured zygoma in the zygomaticotemporal and zygomaticofrontal suture lines, placement of Jelenko arches on the maxillary and mandibular teeth and application of intermaxillary elastics. The elastics were replaced with stainless steel wire four days postoperatively.

Postoperative roentgenograms revealed the maxillary and malar bones to be in good position.

Final postoperative examination revealed healing of the fractures and a good cosmetic and functional result.

Fractures of the maxilla and malar bones can be treated by various methods. Occasionally, it is advantageous to combine intraoral and extraoral procedures to obtain an optimum result.

ALVEOLAR SOFT-PART SARCOMA OF THE TONGUE: REPORT OF CASE

Jack B. Caldwell, Kenneth W. Hughes and Edward J. Fadell. J. Oral Surg. 14:342 Oct. 1956.

Alveolar soft-part sarcoma is a rare neoplasm. It usually occurs during the second or third decades of life. Clinically, it is a slowly growing, firm, asymptomatic mass, usually circumscribed and at least partially encapsulated. Pain is found occasionally. Venous plexuses are often found about the capsule. Microscopic examination of lesions of this type occasionally reveals intravascular invasion. This condition has little effect on the prognosis, and metastatic spread does not always follow. When metastases occur, the lungs are usually the first site. In the majority of instances reported in the literature, local excision was the most common method of treatment. Radiation therapy, when used, was of doubtful value.

A case illustrating the unusual occurrence of alveolar soft-part sarcoma in the deep lingual musculature is reported.

A four year old boy developed a firm, well-circumscribed, nontender mass in the base of the tongue on the right side. The mass had been present approximately three months prior to initial examination. Clinically, the surrounding tissues were of normal appearance and consistency. Roentgenographic examination of the lesion was negative. After initial examination and appraisal, the entire mass was removed through an approach from the right lateral border of the tongue, under general anesthesia. The postoperative course was uneventful, and followup examination one year after surgery indicated that there was no recurrence of the lesion.

Microscopic examination of the excised mass revealed encapsulation of the lesion, with cellular proliferations involving the capsule. Tumor cells were demonstrable within vascular channels adjacent to the capsule. The bulk of the mass appeared to be made up of a proliferation of large oval or polyhedral cells having abundant eosinophilic cytoplasm and moderately large nuclei. Many of the cells had a fine to coarse cytoplasmic granularity. In some areas, a somewhat alveolar pattern was evident. Where the alveolar pattern predominated, capillaries appeared to be elongated and compressed by the proliferated cells.

Although the pathogenesis and nomenclature for this tumor are in dispute, the lesion clinically represents one more entity which must be considered in a differential diagnosis of a neoplasm occurring about the musculature of the oral cavity.

TRAUMA AS A FACTOR IN CAUSING DELAYED REPAIR OF DENTAL EXTRACTION SITES

Charles C. Alling and Donald A. Kerr. J. Oral Surg. 15:3 Jan. 1957.

A theory is advanced that after dental extractions the remnants of the periodontal membrane play a highly significant role in organizing the blood clot. It is proposed that a damaged periodontal membrane would not provide an adequate supply of fibroblasts and angioblasts and an alveolar osteitis, that is, a dry socket, would be more likely to occur.

Bilateral removal of molar teeth of six to eight-month-old monkeys was performed to compare the influence of burnishing trauma induced during extraction to a normal repair of dental alveoli in which the periodontal membrane was not unduly traumatized. On each of 25 monkeys the right first mandibular molar was removed with extraction forceps, and, at the same time, the contralateral molar was removed with elevators and the alveoli burnished with blunt instruments.

The monkeys were studied clinically and histologically at one day, one week, two and three weeks after the extraction procedures.

Clinically, in all 25 monkeys the right, unaffected, control sockets appeared to be within normal limits; on the left side the affected sockets were as follows: 14 showed a moderate delay in repair; 7, considerable delay; and 4 appeared normal. Histologically, in the affected sockets there was a greater incidence of incomplete epithelization at the surface of the socket, less residual periodontal membrane and a retarded new bone formation.

Conclusions were drawn that a delay in repair of dental alveoli may be caused by burnishing trauma during extractions that removes or severely injures the residual periodontal membrane. This is due to physical forces that necrotize the residual periodontal membrane and cause prolonged exudative inflammation.

ORAL LEUKOPLAKIA: REVIEW OF THE LITERATURE

H. C. Russ. J. Oral Surg. 15:40 Jan. 1957.

A review of the literature was made to determine the status of leukoplakia as a precancerous lesion and to establish the areas of this subject that are in need of further study.

Most of the writers agreed that some form of irritant causes leukoplakia, and they also were in agreement on the lack of satisfactory methods of treatment.

The following conclusions were made as a result of the review:

1. Although the majority of writers indicated that they believe leukoplakia is a precancerous lesion, there is not a large volume of conclusive evidence to substantiate this belief.
2. There is need for standardization of terminology, treatment, followup and the reporting of leukoplakia lesions that terminate in cancer.
3. Further research is needed to support the contention that leukoplakia is a precancerous lesion.

A MODIFIED METAL URETHRAL SOUND AS A NEW INSTRUMENT IN ZYGOMATIC REDUCTIONS

Raymond E. Boudreaux. J. Oral Surg. 15:31 Jan. 1957.

The metal urethral sound, which has been used as an instrument for zygomatic reductions for years, was felt to have certain inherent deficiencies when used for this purpose. Two welded metal attachments were added to overcome these deficiencies. The modified sound has been used on a series of 88 patients and is considered to have distinct advantages as an addition to the existing armamentarium. It is used by the author only with the intraoral buccal approach and only with pull force. There is no need for levering action with possible damage to fulcrum region. Five cases are reported.

SEVERE ALLERGIC REACTION DURING THIOPENTAL SODIUM ANESTHESIA

James R. Hayward and Gordon L. Kiester. J. Oral Surg. 15:61 Jan. 1957.

Routine safe utilization of drugs may promote a false sense of security on the part of the surgeon and dull his alertness for the patient who may have the rare, but hazardous, combination of extreme sensitivity response. An instance is reported in which the use of thiopental sodium for routine anesthesia for dental extractions resulted in a severe sensitivity response. Anaphylactic shock and laryngospasm complicated the procedure and necessitated extensive resuscitative measures which are described. The report emphasizes the significance of the allergic state of patients in the selection of anesthetic agents. The effective treatment to counteract such severe reactions should be common knowledge for the oral surgeon responsible for the procedure.

Deaths

Adair, Arthur D., Jr., Geneva, Ala.; Atlanta-Southern Dental College, 1924; died August 28, 1956; aged 54.

Adams, Lee A., LaGrange, Texas; State Dental College, Dallas, 1908; died November 2, 1956; aged 69.

Albertson, Walter B., Dallas, Texas; Ohio College of Dental Surgery, University of Cincinnati, 1923; died October 24, 1956; aged 63.

Allen, Charles E., North Tonawanda, N. Y.; University of Buffalo School of Dentistry, 1901; died October 25, 1956; aged 79.

Angulo, Juan J., Baltimore; Pennsylvania College of Dental Surgery, Philadelphia, 1905; died November 8, 1956.

Anthony, Carlton C., East Pittsburgh; Pittsburgh Dental College, Western University of Pennsylvania, 1906; died August 11, 1956; aged 79.

Austin, George T., Peoria, Ill.; Louisville College of Dentistry of Centre College, 1916; died June 6, 1956; aged 73.

Bachfield, Edward C., Winter Haven, Fla.; Central College of Dentistry, Indianapolis, 1904; died October 13, 1956; aged 75.

Backus, Alvin D., Cedarburg, Wis.; Marquette University Dental School, 1914; died November 4, 1956; aged 66.

Bailey, John A., Columbus, Ohio; Ohio State University College of Dentistry, 1917; died October 8, 1956; aged 62.

Baird, Perry C., Dallas, Texas; Vanderbilt University School of Dentistry, 1900; died September 26, 1956; aged 79.

Baker, Joseph O., St. Paul; University of Minnesota College of Dentistry, 1922; died October 31, 1956; aged 59.

Balthrope, H. W., Whiting, Kan.; Kansas City Dental College, 1895; died July 24, 1956; aged 85.

Banks, Roy H., Escanaba, Mich.; Chicago College of Dental Surgery, Loyola University, 1905; died May 29, 1956; aged 71.

Barbe, Edgar Joseph, New York; College of Dental and Oral Surgery, New York, 1911; died August 27, 1956; aged 66.

Barker, Frank P. K., Gladwyne, Pa.; University of Pennsylvania School of Dentistry, 1907; died November 23, 1956; aged 72.

Baum, Ernest I., Winthrop, Mass.; Chicago College of Dental Surgery, Loyola University, 1918; died April 30, 1956; aged 73.

Baumgartner, Gustav G., Milwaukee; Marquette University Dental School, 1921; died November 8, 1956; aged 76.

Baumrucker, Otto, Cicero, Ill.; Chicago College of Dental Surgery, Loyola University, 1899; died November 3, 1956; aged 80.

Beach, Joseph W., Buffalo; University of Buffalo School of Dentistry, 1894; died October 10, 1956; aged 90.

Bell, De Witt T., Grand Island, N. Y.; University of Buffalo School of Dentistry, 1910; died August 5, 1956; aged 70.

Bender, Alexander, Milwaukee, Wis.; Marquette University Dental School, 1916; died November 1, 1956; aged 70.

Bickford, Edwin W., Lewiston, Maine; University of Maryland, Baltimore College of Dental Surgery, 1902; died November 13, 1956; aged 84.

Blaisdell, Edward W., Milwaukee; Northwestern University Dental School, 1903; died October 3, 1956; aged 79.

Bondy, Cecil H., Newark, Ohio; Ohio State University College of Dentistry, 1931; died July 24, 1956; aged 50.

Braithwaite, Earle S., Marblehead, Ohio; University of Michigan College of Dental Surgery, 1908; died October 12, 1956; aged 71.

Branham, J. Walton, Raleigh, N. C.; Atlanta-Southern Dental College, 1926; died October 23, 1956; aged 53.

Breitbart, Albert, Cleveland; Western Reserve University College of Dentistry, 1924; died October 6, 1956; aged 53.

Brenner, Carl N., New York; New York College of Dentistry, 1910; died October 10, 1956; aged 81.

Bridge, Adelbert A., Tipton, Ind.; Indiana Dental College, 1903; died May 18, 1956; aged 75.

Brown, Cleaveland D., Lake City, Fla.; Atlanta Dental College, 1910; died August 9, 1956; aged 69.

Brown, Gordon G., Kansas City, Mo.; Western Dental College, Kansas City, 1918; died March 4, 1956; aged 63.

Burgess, D. O., Evansville, Ind.; Indiana University School of Dentistry, 1927; died September 1, 1956; aged 51.

Burnham, Van R., Magee, Miss.; Southern Dental College, Atlanta, 1912; died August 23, 1956; aged 69.

Burrus, Hugh C., Hot Springs, Va.; Medical College of Virginia School of Dentistry, 1919; died June 9, 1956; aged 60.

Butler, Reuel A., Bolivar, Tenn.; University of Tennessee College of Dentistry, 1930; died September 15, 1956; aged 49.

Capwell, Rex P. W., Racine, Wis.; Marquette University Dental School, 1912; died October 12, 1956; aged 67.

Catheron, Robert S., Eastport, Maine; Harvard University Dental School, 1905; died November 8, 1956; aged 76.

Caywood, E. S., Ravenna, Ky.; Louisville College of Dentistry of Centre College, 1911; died October 23, 1956; aged 69.

Caywood, Harry E., Lake Park, Iowa; University of Denver School of Dentistry, 1902; died October 1, 1956; aged 79.

Chopourian, Harry M., Watertown, Mass.; Tufts University School of Dental Medicine, 1924; died June 28, 1956; aged 58.

Church, Clarence B., Clarksburg, W. Va.; University of Pittsburgh School of Dentistry, 1913; died September 17, 1956; aged 65.

Cobban, James D., New York; College of Dental and Oral Surgery, New York, 1921; died November 2, 1956; aged 58.

Collins, Francis B., Chelsea, Iowa; Chicago College of Dental Surgery, Loyola University, 1900; died November 4, 1956; aged 79.

Collins, Stephen B., Avon, Mass.; Tufts University School of Dental Medicine, 1904; died October 14, 1956; aged 82.

Conn, Irving L., Minneapolis; University of Minnesota College of Dentistry, 1926; died August 7, 1956; aged 52.

Constien, Frederick W., Ashland, Pa.; University of Pennsylvania School of Dentistry, 1905; died September 24, 1956; aged 73.

Copenhaver, Rufus P., Jr., Tazewell, Va.; Northwestern University Dental School, 1940; died December 5, 1956; aged 40.

Coughlin, William C., Shenandoah, Pa.; died July 2, 1956; aged 63.

Craig, William H., Upland, Calif.; University of Southern California College of Dentistry, 1919; died August 27, 1956; aged 60.

Cramer, Bernard I., Washington, Pa.; University of Pittsburgh School of Dentistry, 1927; died October 17, 1956; aged 50.

Cromb, John R., Fargo, N. D.; Northwestern University Dental School, 1902; died October 9, 1956; aged 78.

Crouch, George O., Manchester, Ga.; Southern Dental College, Atlanta, 1915; died August 23, 1956; aged 70.

Cummings, Philip S., Oxnard, Calif.; University of California College of Dentistry, 1900; died November 29, 1956; aged 78.

Des Portes, Dell V., Roanoke, Va.; Medical College of Virginia School of Dentistry, 1913; died September 10, 1956; aged 64.

Devereaux, Ambrose H., New Haven, Conn.; died October 20, 1956; aged 78.

Dickinson, Urban O., Bellingham, Wash.; North Pacific College of Oregon School of Dentistry, Portland, 1923; died November 16, 1956; aged 59.

Dobey, James A., Johnston, S. C.; Atlanta Dental College, 1905; died July 1, 1956; aged 75.

Doran, Charles H., Danbury, Conn.; University of Pennsylvania School of Dentistry, 1909; died October 22, 1956; aged 74.

Dow, George A., Tottenville, N. Y.; New York University College of Dentistry, 1887; died July 24, 1956; aged 95.

Dowell, Harry E., St. Louis; Washington University School of Dentistry, St. Louis, 1905; died November 15, 1956; aged 76.

Drugmand, Louis W., Imperial, Pa.; University of Pittsburgh School of Dentistry, 1928; died October 30, 1956; aged 53.

Duff, Howard S., San Francisco; University of Southern California College of Dentistry, 1907; died October 31, 1956; aged 71.

Eberhart, Lester C., La Crosse, Kan.; Kansas City Dental College, 1918; died November 19, 1956; aged 65.

Eckroth, Howard B., Danville, Pa.; University of Pittsburgh School of Dentistry, 1901; died October 8, 1956; aged 81.

Ellington, James D., Nacogdoches, Texas; State Dental College, Dallas, 1912; died October 20, 1956; aged 74.

Ellis, Wesley E., Ironwood, Mich.; Washington University School of Dentistry, St. Louis, 1924; died August 11, 1956; aged 56.

Evans, Raymond A., Savannah, Mo.; Northwestern University Dental School, 1914; died October 18, 1956; aged 65.

Fairchild, Guy B., Ft. Lauderdale, Fla.; University of Minnesota College of Dentistry, 1911; died August 5, 1956; aged 70.

Farrell, William I., Troy, N. C.; Atlanta-Southern Dental College, 1928; died August 29, 1956; aged 52.

Finkelstein, Samuel, Jersey City; Philadelphia Dental College, 1906; died November 21, 1956; aged 75.

Fisher, Carl A., Duluth, Minn.; Northwestern University Dental School, 1924; died September 9, 1956; aged 58.

Fleisher, W. R., San Francisco; College of Physicians and Surgeons, San Francisco, 1922; died June 5, 1956; aged 62.

Fogel, Leo H., Dorchester, Mass.; Tufts University School of Dental Medicine, 1926; died October 27, 1956; aged 56.

Fonda, Glen C., Grand Island, Neb.; Creighton University College of Dentistry, 1924; died November 2, 1956; aged 55.

Ford, John E., Petersburg, Ind.; Indiana University School of Dentistry, 1934; died October 2, 1956; aged 45.

Fossum, Carl O., Aberdeen, S. D.; Chicago College of Dental Surgery, Loyola University, 1901; died September 28, 1956; aged 78.

Fowler, Roy C., Winston-Salem, N. C.; Atlanta-Southern Dental College, 1924; died November 1, 1956; aged 61.

Fox, Charles L., New York; New York Dental School, 1900; died December 11, 1956; aged 80.

Fraier, Albert F., Lynn, Mass.; Tufts University School of Dental Medicine, 1923; died November 30, 1956; aged 58.

French, William I., Detroit; University of Michigan College of Dental Surgery, 1915; died November 25, 1956; aged 65.

Fullerton, Kern M., Columbus, Ohio; University of Iowa College of Dentistry, 1889; died July 4, 1956; aged 91.

Furrow, William E., Guthrie, Okla.; Kansas City Dental College, 1895; died August 13, 1956; aged 87.

Fyffe, William H., Los Altos, Calif.; University of Buffalo School of Dentistry, 1903; died October 20, 1956; aged 75.

Gaines, Harry E., Palm Springs, Calif.; Western Reserve University College of Dentistry, 1910; died October 8, 1956; aged 66.

Geer, John L., Rutherfordton, N. C.; University of Maryland, Baltimore College of Dental Surgery, 1905; died September 10, 1956; aged 80.

Gilbert, John E., Seattle; University of Michigan College of Dental Surgery, 1899; died June 7, 1956; aged 72.

Glazier, Lloyd F., Springville, N. Y.; University of Buffalo School of Dentistry, 1901; died October 31, 1956; aged 77.

Golding, Lewis E., Libertyville, Ill.; Chicago College of Dental Surgery, Loyola University, 1902; died October 2, 1956; aged 79.

Grafton, Charles W., West Palm Beach, Fla.; University of Iowa College of Dentistry, 1898; died November 19, 1956; aged 81.

Graham, Walter N., Waco, Texas; Kansas City-Western Dental College, 1936; died November 14, 1956; aged 43.

Grant, Allan H., Marysville, Calif.; University of California College of Dentistry, 1903; died October 5, 1956; aged 86.

Greenwood, George D., Rochester, N. Y.; University of Buffalo School of Dentistry, 1916; died October 23, 1956.

Grimsted, Andrew, Tacoma, Wash.; North Pacific College of Oregon, School of Dentistry, Portland, 1919; died July 13, 1956; aged 65.

Hall, George C., Frankfort, Ky.; University of Louisville School of Dentistry, 1908; died October 13, 1956; aged 75.

Hamilton, Cornelius J., Denver; Western Dental College, Kansas City, 1898; died October 17, 1956; aged 86.

Hamilton, Samuel W. F., Newport, Vt.; Tufts University School of Dental Medicine, 1911; died September 30, 1956; aged 69.

Hamm, Henry A., Lincoln, Ill.; Washington University School of Dentistry, St. Louis, 1901; died November 8, 1956; aged 80.

Haran, Allan T., Brooklyn; New York College of Dentistry, 1921; died November 2, 1956; aged 56.

Harrison, Marion E., Arlington, Va.; George Washington University Dental Department, 1906; died September 30, 1956; aged 71.

Haskett, Edward K., Detroit; University of Michigan College of Dental Surgery, 1943; died August 30, 1956; aged 40.

Haunstein, Harold S., Toledo, Ohio; Chicago College of Dental Surgery, Loyola University, 1927; died November 14, 1956; aged 52.

Henderson, Frank B., Louisville, Ky.; Western Dental College, Kansas City, 1899; died September 26, 1956; aged 81.

Herrig, Joseph P., Bellevue, Iowa; Creighton University College of Dentistry, 1932; died July 29, 1956; aged 48.

Herron, Bernard L., Pittsburgh; University of Pittsburgh School of Dentistry, 1915; died September 27, 1956; aged 64.

Hersh, William, Pittsburgh; University of Pittsburgh School of Dentistry, 1923; died November 24, 1956; aged 56.

Hess, Samuel, New York; New York College of Dentistry, 1889; died November 22, 1956; aged 87.

Hewett, Ashley M., Oak Park, Ill.; Chicago College of Dental Surgery, Loyola University, 1896; died November 28, 1956; aged 84.

Hoffman, Mathias J., Oak Lawn, Ill.; Chicago College of Dental Surgery, Loyola University, 1923; died October 18, 1956; aged 59.

Homer, Joseph, Los Angeles; died October 31, 1956; aged 73.

Hooey, L. E. A., Champaign, Ill.; Northwestern University Dental School, 1904; died November 4, 1956; aged 76.

Hoska, Irven E., Tacoma, Wash.; University of California College of Dentistry, 1902; died November 18, 1956; aged 76.

Hough, John F., Chicago; University of Illinois College of Dentistry, 1915; died September 21, 1956; aged 61.

Huestis, Walter C., Minneapolis; University of Minnesota College of Dentistry, 1903; died October 24, 1956; aged 74.

Huff, Robert E., Chicago; Northwestern University Dental School, 1903; died November 10, 1956; aged 73.

Humphrey, Charles H., Grand Junction, Iowa; University of Iowa College of Dentistry, 1898; died October 25, 1956; aged 85.

Hunt, William J., Memphis, Tenn.; Vanderbilt University School of Dentistry, 1897; died December 6, 1956; aged 84.

Hunter, Elbert A., Walnut, Kan.; Kansas City Dental College, 1906; died November 26, 1956; aged 80.

Hurt, William W., Bristol, Tenn.; University of Tennessee College of Dentistry, 1927; died July 22, 1956; aged 59.

Hyman, Rudolph, Atlantic City, N. J.; University of Pennsylvania School of Dentistry, 1918; died October 14, 1956; aged 61.

Iltis, Henry C., Chicago; Chicago College of Dental Surgery, Loyola University; died October 10, 1956; aged 71.

Imber, William J., Chicago; Chicago College of Dental Surgery, Loyola University, 1917; died November 9, 1956; aged 68.

Irick, John, Garden City, Kan.; Western Dental College, Kansas City, 1914; died September 26, 1956; aged 66.

Jackson, John H., Newton Center, Mass.; Boston Dental College, 1894; died March 14, 1956; aged 81.

Jacobs, William, Brooklyn; Columbia University School of Dental and Oral Surgery, 1925; died September 11, 1956; aged 55.

Jacobson, Oscar, New York; New York University College of Dentistry, 1928; died November 25, 1956; aged 50.

Jefferson, Aurelian W., Memphis, Tenn.; University of West Tennessee Dental Department, Memphis, 1920; died August 28, 1956; aged 76.

Jennings, Charles B., Hillsville, Va.; Atlanta-Southern Dental College, 1919; died August 24, 1956; aged 68.

Johnson, Elbridge H., Pine Bluff, Ark.; University of Tennessee College of Dentistry, 1904; died October 22, 1956; aged 79.

Johnson, Vernon V., Cavalier, N. D.; University of Minnesota College of Dentistry, 1944; died October 22, 1956; aged 36.

Jones, Frederick R., Peoria, Ill.; Chicago College of Dental Surgery, Loyola University, 1919; died November 26, 1956; aged 59.

Jones, Orlando V. D., Lake Villa, Ill.; Northwestern University Dental School, 1907; died May 11, 1956; aged 81.

Justice, Paul Casper, Newton, Iowa; Keokuk Dental College, 1907; died June 27, 1956; aged 75.

Karabasz, Joseph T., Pittsburgh; University of Pittsburgh School of Dentistry, 1922; died August 14, 1956; aged 60.

Karshmer, Louis P., New Brunswick, N. J.; New York College of Dentistry, 1918; died October 5, 1956; aged 61.

Kaufman, Louis E., Chicago; Chicago College of Dental Surgery, Loyola University, 1919; died October 17, 1956; aged 62.

Kelly, William E., Springville, Pa.; Philadelphia Dental College, 1902; died October 19, 1956; aged 85.

Kennehan, Leo B., Marshalltown, Iowa; Creighton University College of Dentistry, 1921; died June 12, 1956; aged 58.

Kernohan, R. H., Jeanette, Pa.; University of Pittsburgh School of Dentistry, 1915; died September 26, 1956; aged 63.

Kerr, Ernest W., Eldorado, Kan.; Kansas City Dental College, 1904; died October 7, 1956; aged 83.

Kerr, James W., Sarasota, Fla.; Western Reserve University College of Dentistry, 1929; died September 13, 1956; aged 59.

Kirtland, Howard B., San Luis Obispo, Calif.; University of California College of Dentistry, 1913; died November 15, 1956; aged 67.

Knapp, William A., Millerton, N. Y.; Philadelphia Dental College, 1896; died September 21, 1956; aged 84.

Knight, A. W., Cadillac, Mich.; Pennsylvania College of Dental Surgery, Philadelphia, 1905; died October 5, 1956; aged 76.

Knox, Samuel E., Carbon Hill, Ala.; Birmingham Dental College, 1907; died August 19, 1956; aged 76.

Kocher, Clarence W., San Pedro, Calif.; University of Southern California College of Dentistry, 1924; died October 7, 1956; aged 54.

Kottmeier, Frank S., Orlando, Fla.; Ohio State University College of Dentistry, 1924; died June 24, 1956; aged 54.

Kubesh, Edward J., Olivia, Minn.; University of Minnesota College of Dentistry, 1917; died July 15, 1956; aged 61.

Laffin, Francis P., Ellsworth, Me.; Baltimore College of Dental Surgery, University of Maryland, 1914; died October 1, 1956; aged 63.

La Grow, Asa J., Oak Park, Ill.; Northwestern University Dental School, 1914; died November 30, 1956; aged 66.

Lanset, Bernard A., New Rochelle, N. Y.; College of Dental and Oral Surgery, New York, 1912; died August 31, 1956; aged 67.

Lasater, Robert L., Fayetteville, Tenn.; died October 3, 1956; aged 93.

Lawton, John R., St. Paul; University of Minnesota College of Dentistry; 1898; died November 17, 1956; aged 83.

Leathers, Thomas H., Champaign, Ill.; Louisville College of Dentistry of Centre College, 1899; died July 25, 1956; aged 86.

Leonard, James J., Chicago; Northwestern University Dental School, 1898; died April 29, 1956; aged 84.

Leonhard, Albert F., Pittsburgh; Pittsburgh Dental College, Western University of Pennsylvania, 1907; died September 15, 1956; aged 70.

Lessem, Harry, New York; New York University College of Dentistry, 1897; died August 31, 1956; aged 90.

Lester, James B., Richmond, Va.; University College of Medicine Dental Department, Richmond, 1906; died July 10, 1956; aged 71.

Levin, Emanuel, Buffalo; University of Buffalo School of Dentistry, 1937; died November 20, 1956; aged 48.

Lewis, Carl S., Pittsburgh; University of Pittsburgh School of Dentistry, 1936; died September 29, 1956; aged 51.

Lill, Charles T., Seattle; North Pacific College of Oregon, School of Dentistry, Portland, 1925; died October 15, 1956; aged 69.

Litman, John B., New Castle, Pa.; University of Pittsburgh School of Dentistry, 1913; died June 14, 1956; aged 69.

Luther, Earl, Rockford, Ill.; Northwestern University Dental School, 1913; died June 3, 1956; aged 67.

Magner, Emile S., New Orleans; New Orleans College of Dentistry, 1905; died October 25, 1956; aged 75.

Manon, Herne C., Washington, Pa.; University of Pittsburgh School of Dentistry, 1914; died November 2, 1956; aged 65.

Marquardt, John, Pueblo, Colo.; University of Denver School of Dentistry, 1910; died September 5, 1956; aged 75.

Marr, Charles E., Porterville, Calif.; College of Physicians and Surgeons, San Francisco, 1912; died November 4, 1956; aged 71.

Masters, Lisle W., Rochelle, Ill.; University of Illinois College of Dentistry, 1918; died May 20, 1956; aged 62.

Mauk, Edwin H., Berkeley, Calif.; University of California College of Dentistry, 1901; died October 8, 1956; aged 82.

Maurer, George F., Brazil, Ind.; Indiana University School of Dentistry, 1936; died November 26, 1956; aged 47.

Maxwell, Albert C., Lawrence, Kan.; Western Dental College, Kansas City, 1916; died October 20, 1956; aged 67.

May, Robert J., Houston, Texas; Atlanta-Southern Dental College, 1919; died October 3, 1956; aged 60.

Maze, Ray F., Maplewood, Mo.; Washington University School of Dentistry, St. Louis, 1932; died October 14, 1956; aged 47.

McBeath, Ewing C., New York; University of Minnesota College of Dentistry, 1910; died November 13, 1956; aged 72.

McCarty, Charles S., Milwaukee; Marquette University Dental School, 1926; died October 10, 1956; aged 54.

McCord, Harvey H., Atlanta, Ga.; Atlanta-Southern Dental College, 1924; died October 7, 1956; aged 58.

McDanel, Mark L., Holden, Mo.; Washington University School of Dentistry, St. Louis, 1901; died October 9, 1956; aged 78.

McLean, Owen E., Morrisonville, Ill.; Washington University School of Dentistry, St. Louis, 1928; died September 22, 1956; aged 53.

Mellin, Carl T., Middletown, Pa.; University of Pittsburgh School of Dentistry, 1927; died October 12, 1956; aged 53.

Milford, Samuel B., Poolesville, Md.; Baltimore College of Dental Surgery, University of Maryland, 1899; died June 10, 1956; aged 92.

Miller, Glen W., Marshalltown, Iowa; University of Iowa College of Dentistry, 1907; died October 27, 1956; aged 73.

Minnich, Grant, Summerdale, Ala.; Vanderbilt University School of Dentistry, 1902; died July 19, 1956; aged 90.

Mitchell, W. L., Clarksburg, W. Va., Ohio College of Dental Surgery, 1907; died July 27, 1956; aged 73.

Moll, Arthur D., Hamburg, Pa.; University of Pennsylvania School of Dentistry, 1934; died November 24, 1956; aged 46.

Monroe, Philip E., Huntington, Ind.; Ohio Medical University College of Dentistry, 1903; died September 5, 1956; aged 79.

Moody, Charles W., Guthrie, Ky.; Vanderbilt University School of Dentistry, 1901; died October 29, 1956; aged 80.

Mooers, Charles E., Chicago; Chicago College of Dental Surgery, Loyola University, 1913; died May 22, 1956; aged 69.

Moore, Enos W., Malden, Mass.; Boston Dental College, 1898; died November 5, 1956; aged 81.

Moorefield, T. C., Beckley, W. Va.; died June 17, 1956; aged 59.

Morin, Amos, Pawtucket, R. I.; University of Montreal Faculty of Dental Surgery, 1925; died June 1956; aged 60.

Morrison, Joseph P., Mount Carmel, Pa.; Pennsylvania College of Dental Surgery, Philadelphia, 1900; died November 22, 1956; aged 83.

Morrow, Lloyd M., Glenwood, Iowa; University of Iowa College of Dentistry, 1919; died November 4, 1956; aged 65.

Morsch, Willard J., Armstrong, Iowa; University of Iowa College of Dentistry, 1928; died November 15, 1956; aged 57.

Motsch, William J., Erie, Pa.; University of Pittsburgh School of Dentistry, 1931; died November 4, 1956; aged 52.

Mullin, Francis James R., Concord, N. H.; Harvard University Dental School, 1930; died October 19, 1956; aged 54.

Murray, Hugh L., Ironton, Ohio; University of Louisville School of Dentistry, 1939; died August 19, 1956; aged 41.

Nations, Guy J., Quincy, Ill.; Washington University School of Dentistry, St. Louis, 1902; died October 6, 1956; aged 75.

Neidigh, James D., Seattle; North Pacific College of Oregon, School of Dentistry, Portland, 1918; died November 16, 1956; aged 62.

Nelson, Walter J., Providence, R. I.; University of Maryland, Baltimore College of Dental Surgery, 1936; died November 21, 1956; aged 43.

Newsome, William G., Troy, Ala.; Meharry Medical College Dental Department, 1919; died September 6, 1956; aged 64.

Niederwimmer, Oscar J., Marceline, Mo.; Kansas City Dental College, 1906; died November 18, 1956; aged 73.

Niles, Frederic B., Binghamton, N. Y.; University of Buffalo School of Dentistry, 1897; died September 12, 1956; aged 83.

Norcross, Charles E., Hartland, Me.; died January 13, 1956; aged 68.

Nordeen, Orvl J., Oakhurst, Calif.; University of Southern California College of Dentistry, 1920; died September 13, 1956; aged 59.

O'Keefe, Everett B., Alliance, Neb.; Creighton University College of Dentistry, 1919; died November 7, 1956; aged 60.

Outlaw, Joseph W., Beaumont, Texas; Texas Dental College, Houston, 1917; died October 4, 1956; aged 65.

Owen, James C., Griffin, Ga.; Atlanta Dental College, 1902; died November 5, 1956; aged 82.

Paige, Otto B., Indianapolis; Indiana Dental College, 1922; died October 13, 1956; aged 59.

Parsons, Ernest, Somerset, Ky.; Louisville College of Dentistry of Centre College, 1908; died November 7, 1956; aged 79.

Payne, Thomas E., Roanoke, Va.; University College of Medicine, Dental Department, Richmond, 1909; died August 9, 1956; aged 72.

Peach, William E., Stafford, Conn.; Temple University School of Dentistry, 1908; died October 1956; aged 74.

Pearce, Frederick B., San Jose, Calif.; University of California College of Dentistry, 1901; died November 19, 1956; aged 83.

Pence, Henry C., Taylorville, Ill.; Northwestern University Dental School, 1900; died July 7, 1956; aged 80.

Penrose, Howard M., Long Beach, Calif.; University of Southern California College of Dentistry, 1925; died July 29, 1956; aged 53.

Perkins, John W., Birmingham, Ala.; Vanderbilt University School of Dentistry; died November 1956; aged 87.

Perry, Ernest R., Whitestone, N. Y.; University of Pennsylvania School of Dentistry, 1915; died July 30, 1956; aged 63.

Phifer, Le Roy H., Chicago; University of Illinois College of Dentistry, 1907; died November 3, 1956; aged 72.

Pilcher, Chester S., Denver; University of Denver School of Dentistry, 1932; died October 30, 1956; aged 49.

Pilcher, Harold E., Davenport, Iowa; University of Iowa College of Dentistry, 1918; died November 8, 1956; aged 63.

Pilmore, Van W., Detroit; Indiana Dental College, 1916; died November 13, 1956; aged 62.

Pines, Samuel, Brooklyn; Western Reserve University College of Dentistry, 1919; died October 31, 1956; aged 60.

Plant, Albert C., Wheeling, W. Va.; Western Reserve University College of Dentistry, 1902; died November 19, 1956; aged 82.

Poindexter, John R., Temple, Texas; died June 19, 1956; aged 89.

Powers, James H., Peabody, Mass.; Tufts University School of Dental Medicine, 1918; died March 2, 1956; aged 62.

Pursell, Murat G., Chicago; Chicago College of Dental Surgery, Loyola University, 1921; died September 8, 1956; aged 66.

Quinn, Thomas W., Cortez, Colo.; Creighton University College of Dentistry, 1916; died September 15, 1956; aged 62.

Rattner, Aron, Chicago; University of Illinois College of Dentistry, 1927; died November 13, 1956; aged 73.

Reardon, Marcus E., South Ft. Mitchell, Ky.; Ohio College of Dental Surgery, University of Cincinnati, 1902; died November 1, 1956; aged 79.

Reed, Edgar C., Tavares, Fla.; Ohio Medical University College of Dentistry, 1899; died July 16, 1956; aged 81.

Reeves, Clair L., Strong, Ark.; Vanderbilt University School of Dentistry, 1909; died October 26, 1956; aged 77.

Reeves, Hoyt J., Atlanta, Ga.; Vanderbilt University School of Dentistry, 1916; died November 28, 1956; aged 64.

Regan, Francis W., Brookline, Mass.; Tufts University School of Dental Medicine, 1910; died January 18, 1956; aged 73.

Rennie, Leland L., Chicago; Chicago College of Dental Surgery, Loyola University, 1913; died May 10, 1956; aged 64.

Reppeto, John, Del Rio, Texas; Marquette University Dental School, 1925; died November 16, 1956; aged 69.

Rezet, Benjamin G., Philadelphia; Temple University School of Dentistry, 1931; died November 22, 1956; aged 50.

Richards, Ernest F., Sparta, Tenn.; Vanderbilt University School of Dentistry, 1910; died September 26, 1956; aged 70.

Ridgway, Hubert R., Sedro Woolley, Wash.; North Pacific College of Oregon, School of Dentistry, Portland, 1919; died November 28, 1956; aged 67.

Riley, Daniel H., Newton, Ill.; Northwestern University Dental School, 1905; died October 24, 1956; aged 74.

Ritchey, John S., Joplin, Mo.; Kansas City-Western Dental College, 1924; died September 28, 1956; aged 59.

Robinson, Louis, Beverly Hills, Calif.; University of California College of Dentistry, 1922; died July 2, 1956; aged 64.

Robinson, Phil H., Los Angeles, Calif.; Meharry Medical College Dental Department, 1950; died November 21, 1956; aged 40.

Rossel, Carl G., Columbus, Ohio; Ohio State University College of Dentistry, 1923; died October 24, 1956; aged 56.

Roth, William H., Aroma Park, Ill.; Chicago College of Dental Surgery, Loyola University, 1899; died May 12, 1956; aged 75.

Rowan, A. M., Milwaukee; Northwestern University Dental School, 1899; died October 7, 1956; aged 80.

Rowe, Catherine A., Boston; Tufts University School of Dental Medicine, 1909; died November 2, 1956; aged 65.

Roy, Edward E., New York; Atlanta-Southern Dental College, 1898; died August 30, 1956; aged 85.

Ryder, H. Landon B., St. Petersburg, Fla.; New York College of Dentistry, 1893; died August 4, 1956; aged 83.

Salles, Paul, Lafayette, La.; Baltimore College of Dental Surgery, University of Maryland, 1912; died October 10, 1956; aged 66.

Samuels, George, New York; Columbia University School of Dental and Oral Surgery, 1924; died October 13, 1956; aged 56.

Schneider, Jacob J., Jasper, Ind.; Indiana Dental College, 1904; died August 23, 1956; aged 74.

Schroeder, George P., St. Louis, Mo.; St. Louis University School of Dentistry, 1921; died October 9, 1956; aged 63.

Schroth, Francis G., Dormont, Pa.; died July 19, 1956; aged 51.

Schwartz, Paul A., Norwich, Conn.; Harvard University Dental School, 1918; died October 14, 1956; aged 60.

Scott, Franklin S., Wellston, Ohio; University of Pennsylvania School of Dentistry, 1900; died September 26, 1956; aged 78.

Seaman, Edward M., Camarillo, Calif.; University of California College of Dentistry, 1920; died November 27, 1956; aged 63.

Seebold, Frank P., New Cumberland, Pa.; University of Pennsylvania School of Dentistry, 1889; died November 26, 1956; aged 91.

Simmonds, Daniel G., Utica, N. Y.; University of Buffalo School of Dentistry, 1897; died November 1, 1956; aged 82.

Simmonds, Eugene B., Muncie, Ind.; Indiana University School of Dentistry, 1904; died November 16, 1956; aged 79.

Sinclair, Strange L., Terre Haute, Ind.; Vanderbilt University School of Dentistry, 1901; died August 4, 1956; aged 83.

Singletary, Rex, Baton Rouge, La.; Tulane University School of Dentistry, 1912; died June 1956; aged 67.

Smith, Henry H., Vero Beach, Fla.; University of Maryland, Baltimore College of Dental Surgery, 1925; died November 28, 1956; aged 55.

Smith, Robert E., Louisville, Ky.; Howard University College of Dentistry, 1923; died November 19, 1956; aged 60.

Smith, Winfield Scott, Charleston, S. C.; Northwestern University Dental School, 1928; died November 21, 1956; aged 66.

Smithwick, Daniel T., Louisburg, N. C.; Baltimore College of Dental Surgery, University of Maryland, 1890; died October 19, 1956; aged 89.

Sparks, Kenneth A., North Vernon, Ind.; Indiana University School of Dentistry, 1927; died November 18, 1956; aged 54.

Sprake, Richard A., Denver, Colo.; Ohio College of Dental Surgery, University of Cincinnati, 1895; died October 12, 1956; aged 85.

Stamer, Joseph A., Stockton, Calif.; College of Physicians and Surgeons, San Francisco, 1914; died October 16, 1956; aged 76.

Stark, Merle R., Ft. Wayne, Ind.; Indiana Dental College, 1915; died October 12, 1956; aged 62.

Stepanek, Charles, Chicago; Chicago College of Dental Surgery, Loyola University, 1914; died October 20, 1956; aged 64.

Stewart, John G., Ambler, Pa.; University of Pennsylvania School of Dentistry, 1915; died September 28, 1956; aged 63.

Stocker, Aaron Don, Alton, Ill.; Missouri Dental College, St. Louis, 1898; died October 3, 1956; aged 80.

Stone, Lambert G., Calimesa, Calif.; Chicago College of Dental Surgery, Loyola University, 1913; died September 22, 1956; aged 73.

Stone, Raymond J., Minneapolis; Chicago College of Dental Surgery, Loyola University, 1918; died October 21, 1956; aged 62.

Straight, Frank W., Markesan, Wis.; Marquette University Dental School, 1904; died June 29, 1956; aged 73.

Street, Zeph W., St. Louis; St. Louis University School of Dentistry, 1908; died October 15, 1956; aged 59.

Strickland, John R., Flovilla, Ga.; Atlanta-Southern Dental College, 1913; died October 1956; aged 68.

Strosnider, Charles W., Columbus, Ohio; Starling-Ohio Medical College, Department of Dentistry, 1912; died October 2, 1956; aged 73.

Struble, Phil S., Holyoke, Colo.; St. Louis Dental College, 1906; died July 19, 1956; aged 73.

Summers, Frederic G., Ingram, Texas; Texas Dental College, Houston, 1936; died October 24, 1956; aged 45.

Thayer, John P., Freeport, N. Y.; Tufts University School of Dental Medicine, 1902; died July 20, 1956; aged 76.

Thom, Charles P., Columbus, Ohio; Ohio State University College of Dentistry, 1945; died November 7, 1956; aged 34.

Thompson, John W., Omaha, Neb.; University of Nebraska College of Dentistry, 1917; died October 15, 1956; aged 63.

Thurmon, John Weldon, Ruston, La.; Atlanta Dental College, 1905; died October 1956; aged 73.

Toff, Jules, New York; College of Dental and Oral Surgery, New York, 1909; died September 27, 1956; aged 68.

Tomb, David D., Youngstown, Ohio; Cincinnati College of Dental Surgery, 1918; died December 2, 1956; aged 60.

Towey, Joseph B., Minneapolis; Chicago College of Dental Surgery, Loyola University, 1911; died September 27, 1956; aged 66.

Tretbar, Julius G., Stafford, Kan.; Kansas City Dental College, 1909; died September 22, 1956; aged 73.

Truell, Earl R., Lincoln, Neb.; Lincoln Dental College of Cotner University, 1902; died June 6, 1956; aged 80.

Vance, John W., Akron, Ohio; Indiana Dental College, 1896; died July 22, 1956; aged 86.

Van Drezer, Homer F., Grand Rapids, Mich.; Chicago College of Dental Surgery, Loyola University, 1905; died October 2, 1956; aged 73.

Van Kammen, Anthony, Grand Rapids, Mich.; University of Michigan College of Dental Surgery, 1892; died August 5, 1956; aged 90.

Vinson, T. D., Atlanta, Ga.; died August 6, 1956; aged 61.

Von Ruden, Herman A., Pontiac, Ill.; Northwestern University Dental School, 1918; died April 18, 1956; aged 60.

Walker, George H., Los Angeles, Calif.; College of Physicians and Surgeons, San Francisco, 1901; died June 22, 1956; aged 79.

Walton, Percy B., Washington, D. C.; Georgetown University School of Dentistry, 1927; died October 18, 1956; aged 59.

Ward, Richard T., Bradenton, Fla.; Chicago College of Dental Surgery, Loyola University, 1903; died September 25, 1956; aged 81.

Weaver, Harold T., Chicago; Northwestern University Dental School, 1902; died August 19, 1956; aged 85.

Webb, Clinton C., Manistee, Mich.; Chicago College of Dental Surgery, Loyola University, 1901; died September 13, 1956; aged 77.

Weber, Donald J., Millersburg, Ohio; Ohio State University College of Dentistry, 1932; died October 21, 1956; aged 48.

Wehunt, Evan S., Cherryville, N. C.; Atlanta-Southern Dental College, 1919; died August 29, 1956; aged 65.

Wells, James A., Shawnee, Okla.; Chicago College of Dental Surgery, Loyola University, 1899; died September 20, 1956; aged 84.

Wells, William T., Wichita Falls, Texas; Baylor University College of Dentistry, 1919; died November 20, 1956; aged 61.

Wellward, Burton C., Hollywood, Fla.; Columbia University School of Dental and Oral Surgery, 1932; died August 23, 1956; aged 49.

Westman, Leonard V., Minneapolis; University of Minnesota, College of Dentistry, 1921; died August 6, 1956; aged 60.

Whalen, Joseph A., Jersey City; died October 5, 1956; aged 63.

Wharton, Edward L., Newark, N. J.; New York College of Dentistry, 1904; died June 17; aged 73.

Wheless, Robert L., Austin, Texas; University of Pennsylvania School of Dentistry, 1909; died September 18, 1956; aged 71.

Whipple, Willis W., Salamanca, N. Y.; University of Michigan College of Dental Surgery, 1907; died August 19, 1956; aged 74.

White, George W., Yakima, Wash.; North Pacific College of Oregon, School of Dentistry, Portland, 1923; died November 7, 1956; aged 60.

White, James D., Amsterdam, N. Y.; University of Pennsylvania School of Dentistry, 1915; died November 25, 1956; aged 63.

Whiteside, Wilfred D., Timpson, Texas; Texas Dental College, Houston, 1930; died May 31; aged 51.

Whitmarsh, H. DeForest, Binghamton, N. Y.; University of Pennsylvania School of Dentistry, 1919; died June 25; aged 60.

Wick, Will W., Sheboygan, Wis.; Northwestern University Dental School, 1903; died August 25, 1956; aged 79.

Wier, John C., Houston, Texas; University of Memphis College of Dental Surgery, 1910; died September 23, 1956; aged 70.

Wilkie, Frank J., Ravenna, Neb.; Creighton University, College of Dentistry, 1908; died April 18; aged 73.

Williams, George D., Spokane, Wash.; University of Minnesota College of Dentistry, 1903; died May 21; aged 75.

Williams, John L., Hickman Mills, Mo.; University of Kansas City, School of Dentistry, 1951; died June 16; aged 29.

Williams, Lawrence B., Carrollton, Texas; State Dental College, 1913; died May 5; aged 71.

Williams, Leroy, Springfield, Mo.; St. Louis University School of Dentistry, 1919; died September 30, 1956; aged 66.

Wilson, Donald C., Sewickley, Pa.; University of Pittsburgh School of Dentistry, 1928; died October 3, 1956; aged 56.

Wilson, John M., San Diego; University of Southern California, College of Dentistry, 1912; died June 23; aged 83.

Wilson, John W., Santa Ana, Calif.; University of Southern California, College of Dentistry, 1923; died June 8; aged 55.

Wolfrum, Otto G., Rockford, Ill.; Northwestern University Dental School, 1897; died October 16, 1956; aged 83.

Wolgast, Paul A., Glen Ellyn, Ill.; Chicago College of Dental Surgery, Loyola University, 1928; died July 20; aged 53.

Wood, Arthur E., Cabool, Mo.; Marion-Sims Dental College, St. Louis, 1900; died August 4, 1956; aged 82.

Woods, George C., Magnolia, Ohio; Ohio Medical University College of Dentistry, 1900; died September 20, 1956; aged 83.

Workman, Clarence B., Woodward, Okla.; Kansas City Dental College, 1905; died November 2, 1956; aged 73.

Worthen, Oscar J., Saranac Lake, N. Y.; died May 24, 1956; aged 70.

Wright, Fred W., Brookhaven, Miss.; Vanderbilt University School of Dentistry, 1919; died July 1956; aged 59.

Wright, Willard F., St. Louis; St. Louis University School of Dentistry, 1939; died March 10, 1956; aged 41.

Wursch, Charles S., Chicago; Chicago College of Dental Surgery, Loyola University, 1933; died August 25, 1956; aged 46.

Wyckoff, Raymond T., Philadelphia; Temple University School of Dentistry, 1924; died August 6, 1956; aged 64.

Yeater, Harvey U., Hagerstown, Md.; Baltimore College of Dental Surgery, University of Maryland, 1918; died August 28, 1956; aged 63.

Yokie, William C., Hancock, Mich.; Chicago College of Dental Surgery, Loyola University, 1916; died September 12, 1956; aged 68.

Young, Garland L., Indianapolis; Indiana Dental College, 1910; died September 30, 1956; aged 67.

Young, John Q., Portland, Ore.; Chicago College of Dental Surgery, Loyola University, 1905; died October 13, 1956; aged 79.

Zauderer, Jacob M., New York; University of Buffalo School of Dentistry, 1937; died October 24, 1956; aged 45.

Zech, Lando W., Seattle; North Pacific College of Oregon, School of Dentistry, Portland, 1923; died April 7; aged 60.

Zellman, Ralph M., Harbor Beach, Mich.; University of Michigan College of Dental Surgery, 1930; died November 21, 1956; aged 53.

Zincke, Eric, Bucyrus, Ohio; University of Michigan, College of Dental Surgery, 1902; died January 19; aged 81.

Zimmerman, Martin C., Kansas City, Mo.; Kansas City-Western Dental College, 1920; died October 31, 1956; aged 74.

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Roentgenology: Donald T. Waggener, 800 S. 13th St., Lincoln, Neb.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York
One-Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 16-18	Birmingham	F. A. Finney, Jr.	Box 787, Gadsden
Alaska			C. L. Polley	Box 1896, Juneau
Arizona	May 1-4	Chandler	W. G. Burke	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 7-10	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 13-17	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 7-10	Los Angeles	S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 6-9	Colorado Springs	G. H. Jackson	Republic Bldg., Denver
Connecticut	May 15-17	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			J. C. Gantt	1102 N. Jackson, Wilmington
District of Columbia	Mar. 10-13	Washington	J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	Apr. 15-17	St. Petersburg	W. C. Mayo	Brent Annex, Pensacola
Georgia	Sept. 29-Oct. 2	Atlanta	J. W. Yarbrough	Southern United Bldg., Macon
Hawaii	June	Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	May 16-18	Pocatello	M. R. Johnson	1606 E. Center St., Pocatello
Illinois	May 12-15	Peoria	P. W. Clopper	Jefferson Bldg., Peoria
Indiana	May 20-22	Indianapolis	W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa	May 5-8	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 13-16	Wichita	F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky	Mar. 31-Apr. 3	Louisville	A. B. Coxwell, Jr.	1976 Douglass Blvd., Louisville
Louisiana	Apr. 24-27	Lake Charles	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 20-22	Kennebunkport	S. M. Gower	Box 27, Skowhegan
Maryland	May 5-8	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 5-8	Boston	H. E. Tingley	12 Bay State Rd., Boston 15
Michigan	Apr. 8-10	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 1-3	Minneapolis	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4W.
Mississippi	Apr. 28-May 1	Jackson	B. A. Cohen	Plaza Bldg., Jackson 27
Missouri	May 26-29	St. Louis	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 1-3	Billings	E. G. Vedova	Box 311, Roundup
Nebraska	Apr. 29-May 1	Lincoln	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	May 5-7	Las Vegas	O. M. Seifert	755 Ryland Ave., Reno
New Hampshire	June 16-19	Whitefield	F. E. Williams	814 Elm St., Manchester
New Jersey	May 12-15	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 19-22	Albuquerque	J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York	May 20-22	New York	C. A. Wilkie	1 Hanson Pl., Brooklyn
North Carolina	May 5-8	Pinehurst	L. H. Butler	Jefferson Bldg., Greensboro
North Dakota	Apr. 28-May 1	Fargo	J. H. Pfister	419½ Dakota Ave., Wahpeton

State	Date	Place	Secretary	Address
Ohio	Oct. 6-9	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 14-17	Tulsa	S. A. Russman	1219 Classen Dr., Oklahoma City
Oregon	Mar. 4-6	Portland	T. D. Holder	Selling Bldg., Portland
Panama Canal Zone	Apr. 4, 5	Albrook A.F.B.	A. L. Robertson	5700 USAF Dispensary, Albrook Air Force Base
Pennsylvania	May 23-25	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			R. Carrasquillo	P. O. Box 214, De Diego #3 Rio Piedras
Rhode Island			J. S. Allen	Union Trust Bldg., Providence
South Carolina	May 12-14	Myrtle Beach	J. E. Wallace	1420 Gregg St., Columbia
South Dakota	May 12-15	Watertown	R. E. Decker	Box 308, Parker
Tennessee	May 13-16	Gatlinburg	A. M. Ballentine	215 W. Flower St., Pulaski
Texas	Apr. 28-May 1	Houston	W. Ogle	3707 Gaston Ave., Dallas 10
Utah	May 23-25	Salt Lake City	R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont	May 26-28	Manchester	E. H. Van Santvoord	22 Washington St., Rutland
Virginia	Apr. 29-May 1	Virginia Beach	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington	Apr. 1-3	Seattle	J. M. Deines	Medical & Dental Bldg., Seattle
West Virginia	July 21-24	White Sulphur Springs	G. N. Casto, Jr.	3820 McCorkle Ave., S.E., Charleston
Wisconsin	Apr. 29-May 1	Milwaukee	H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June	Sheridan	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 9-14* June 10, 11†	Birmingham	W. L. McCarty	Professional Bldg., Montgomery
Alaska	July 9-12*†	Anchorage	R. H. Williams	Box 2122, Juneau
Arizona	June 24-28* June 26†	Florence	W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas			W. T. Jones	107 E. Shelton, Monticello
California	June 24 July 29	Los Angeles San Francisco	T. G. Atwood	450 Sutter St., San Francisco
Colorado	June 24-28‡		R. F. Gilmore	Republic Bldg., Denver 2
Connecticut	June 24-26* June 28, 29* June 27-29†	Boston Bridgeport Bridgeport	C. G. Brooks	302 State St., New London
Delaware	June 24*† June 25-27*†	Philadelphia Wilmington	P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	1835 Eye St., N.W., Washington
Florida	July 8-18*†	Jacksonville	R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia			W. G. Brown	Blackshear
Hawaii			H. L. Houvener	Dillingham Bldg., Honolulu
Idaho	June 24-26	Boise	A. G. DeWinter	Sun Bldg., Boise
Illinois			W. A. McKee	Wood Bldg., Benton
Indiana	June 11-14*†‡		C. A. Frech	Gary National Bank Bldg., Gary
Iowa	May 27-31*†	Iowa City	P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas	June 3-6	Kansas City, Mo.	G. L. Teall	Box 71, Hiawatha
Kentucky	June 10-13*†	Louisville	J. J. Kelly	102 W. Madison St., Franklin
Louisiana	June 2-7‡		R. C. Steib	Maison Blanche Bldg., New Orleans
Maine			A. S. Appleby	Box 260, Skowhegan
Maryland	June 10-12‡		H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts			T. J. Glennon	323 Main St., Woburn
Michigan	June 9-15	Ann Arbor	J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota	June 17-21*†	Minneapolis	M. G. Walls	Lowry Bldg., St. Paul
Mississippi	June 18-20*†	Jackson	J. C. Boswell	Medical Arts Bldg., Jackson
Missouri	June 10-15, 17, 18* June 10, 13, 17, 18†	Kansas City	R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena
Nebraska			H. E. Weber	Federal Securities Bldg., Lincoln
Nevada	June 24	Reno	A. A. Cozzalio	130 N. Virginia, Reno
New Hampshire	June 20, 21* June 20†	Boston	S. G. Markos	8 Renaud Ave., Dover

State	Date	Place	Secretary	Address
New Jersey	June 10, 11*	Philadelphia	C. J. Schweikhardt	150 E. State St., Trenton 8
	June 14, 15*	Trenton		
	June 18, 19*	New York		
	June 26, 27*	Philadelphia		
	May 31, June 1†	Teaneck		
New Mexico			J. J. Clarke, Sr.	Artesia
New York	July 1, 2, 9-12*‡		D. W. Beier	23 S. Pearl St., Albany 7
	July 1, 2, 9, 10†‡			
	Dec. 10-13*‡			
North Carolina	June 24*†	Chapel Hill	J. H. Guion	Doctors Bldg., Charlotte 7
North Dakota	July 8-12	Fargo	T. M. Flath	Williston
Ohio			H. B. Smith	322 E. State St., Columbus 15
Oklahoma			W. E. Cole	2420 N. Meridian, Oklahoma City
Oregon	June 10-13*†	Portland	F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania	June 16-21*	Philadelphia	R. E. V. Miller, Sr.	Dept. of Public Instruction,
	June 16-19†	Pittsburgh		Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Comercio St. #452, San Juan
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina	June 13-15	Columbia	J. L. Gunter	1226 Pickens St., Columbia 1
South Dakota	June 23-26*†	Sioux Falls	H. T. Aker	Canton
Tennessee	June 10-15	Memphis	C. R. Aita	Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber	Capitol National Bank Bldg., Austin 16
Utah	June 24-30‡		A. Ridge, Jr.	10 S. Second E., Provo
Vermont	June 24-26*†	Burlington	P. M. Fitch	Newport
Virginia	June 10-15*	Richmond	J. M. Hughes	Medical Arts Bldg., Richmond
	June 10, 11†			
Washington	June 24-27	Seattle	F. S. Rotchford	1108 S. Washington St., Olympia
West Virginia	June 24-26	West Liberty	C. C. Cottrill	Box 111, Glen Rogers
Wisconsin	June 3-7*†	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
Academy of Denture Prosthetics	Apr. 28-May 4	Columbus, Ohio	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine	May 29-31	Boston	G. J. Witkin Secy.	45 S. Broadway, Yonkers, N. Y.
American Academy of Oral Pathology	Apr. 6-8	Washington, D.C.	J. L. Bernier Secy.	Armed Forces Institute of Pathology, Walter Reed Army Medical Center, Washington, D.C.
American Association of Dental Schools	Mar. 24-27	Atlantic City, N. J.	M. W. McCrea Secy.	42 S. Green St., Baltimore
American Association of Industrial Dentists	Apr. 20-26	St. Louis	E. R. Aston Secy.	Pennsylvania Dept. of Health, P. O. Box 90, Harrisburg, Pa.
American Association of Orthodontists	May 13-16	New Orleans	E. E. Shephard Secy.	8230 Forsyth Blvd., St. Louis
American Board of Pedodontics	July 25-27	San Francisco	R. L. Ireland Secy.	College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Dental Society of Europe	Aug. 28-31	Lausanne, Switzerland	J. P. Molony Secy.	110 Harley St., London W. 1, England
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 25	New York	M. H. Feldman Exec. Secy.	730 Fifth Ave., New York 19
Berkshire Conference in Oral Pathology and Periodontology	June 16-20	Lenox, Mass.	I. Glickman Dir.	Tufts University, School of Dental Medicine, 136 Harrison Ave., Boston 11
British Columbia Dental Association	May 16-18	Victoria, B.C., Canada	D. Parfitt	Medical Dental Bldg., Vancouver, B.C., Canada
British Dental Association	July 1-5	Newcastle on Tyne, England	H. P. Buchanan Secy.	13 Hill St., Berkeley Square, London W. 1, England

Name	Date	Place	Secy. or Chm.	Address
Canadian Dental Association in co-operation with Western Canada Dental Society	June 23-26	Winnipeg, Canada	D. W. Gullett Secy.	Canadian Dental Association, 234 St. George St., Toronto 5, Ont., Canada
Chicago Dental Society		Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Cincinnati Dental Society	Mar. 17-19	Cincinnati	H. G. Frankel Chm.	Doctors Bldg., Cincinnati
Cleveland Dental Society	May 6-8	Cleveland	L. H. Samartini Gen. Chm.	710 Carnegie Hall Bldg., Cleveland 15
Council on Dental Education, Dental Aptitude Tests	Apr. 26, 27		S. Peterson Secy.	222 E. Superior St., Chicago
Federation Dentaire Internationale, Twelfth International Dental Congress	Sept. 7-14	Rome, Italy	P. Lalli Secy. Gen.	Via Boezio 16, Rome, Italy
Greater Philadelphia Annual Meeting	Mar. 26-29	Philadelphia	H. Silver Exec. Secy.	Bellevue-Stratford Hotel, Broad and Walnut Sts., Philadelphia 2
International Academy of Oral Dynamics	Mar. 9	Washington, D.C.	R. K. Sindmack	573 Bloomfield Ave., Verona, N. J.
International Association for Dental Research	Mar. 21-23	Atlantic City, N. J.	D. Y. Burrill Asst. Secy.	129 E. Broadway, Louisville 2, Ky.
Japan Dental Association, Biennial National Meeting	Apr. 28-30	Tokyo	T. Kashima Dir.	1-Chome, Ogawa-machi, Kanda, Tokyo, Japan
National Board of Dental Examiners	Apr. 1, 2		G. J. Casey Secy.	222 E. Superior St., Chicago
National Dental Association	Aug. 4-8	Hot Springs, Ark.	J. A. Jackson Secy.	P. O. Box 197, Charlottesville, Va.
Northwest Academy of Dental Medicine	May 12-16	Sun Valley, Idaho	G. Underwood Secy.	Selling Bldg., Portland 5, Ore.
Pacific Coast Dental Conference	Aug. 19-22	San Diego	C. W. Gilman Secy.	219 E. 8th St., National City, Calif.
Semaine Odontologique Internationale, Sixty-Third Dental Congress of Paris	Apr. 11-17	Paris, France	M. Vincent Gen. Secy.	31, rue Tronchet, Paris, France
Societe Suisse d'Odontologie, Annual Congress	May 31-June 2	Bürgenstock, Switzerland	Secretary	Spitalgasse 37, Berne, Switzerland
Southeastern Society of Oral Surgeons	May 9-11	New Orleans	J. E. Skaggs Secy.	Francis Bldg., Louisville 2, Ky.
Southern Academy of Oral Surgery, Inc.	Mar. 16, 17	Atlanta, Ga.	R. F. Sullivan Secy.	118 Jones St., E., Savannah, Ga.
Third International Medical and Surgical Meetings—International Medical and Health Exhibition	June 1-9	Turin, Italy	B. Roccia Dir.	Dentistry Clinic, University of Turin, Corso Polonia 2, Turin, Italy
Thomas P. Hinman Mid-Winter Clinic	Mar. 17-20	Atlanta, Ga.	E. K. Patton Gen. Chm.	Box 136, Ben Hill Sta., Atlanta 11, Ga.
Western Society of Periodontology	Mar. 29-31	Las Vegas, Nev.	C. L. Foss	239 E. Laurel St., San Diego 1, Calif.

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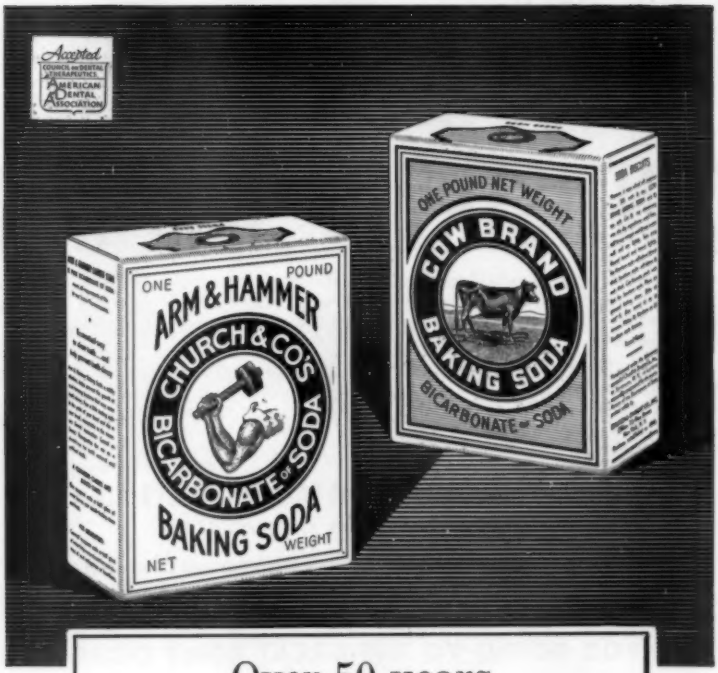

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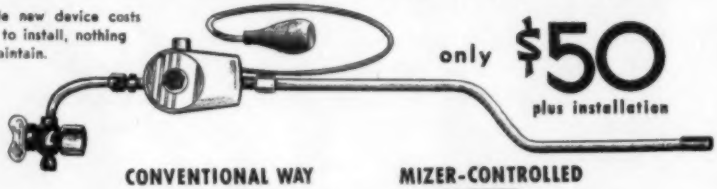

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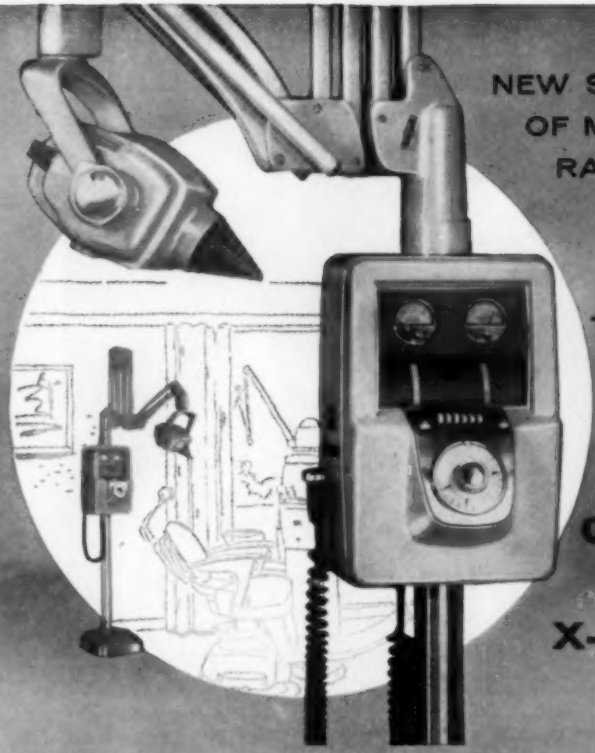

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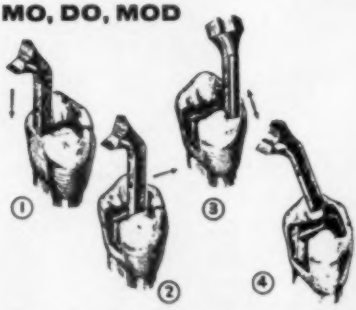

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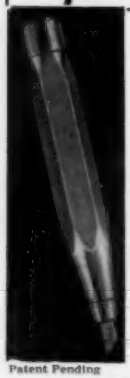

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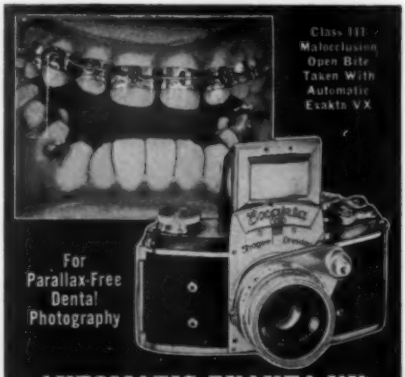

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1. Bowes, A. deP.: Dietotherapy—Nutrition of Children During Their School Years, Am. J. Clin. Nutrition *3*:254 (May-June) 1955.

2. Sebrell, W. H., Jr.: Trends and Needs in Nutrition, J.A.M.A. *158*:42 (May 2) 1955.

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MARYLAND—Available soon, rent, lease, sale, options, one or two chair air-conditioned in modern, garden-type, 420 unit apartment development along main road in suburb adjoining Washington, D. C. Owner in service. Attractive terms can include Ivory Model "E" Ritter Unit, motor-chair, American Mobile cabinet, Castle-Panovision, autoclave, McKesson-Nargraff, etc. Address A.D.A. Box No. 519.

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MARYLAND—Young dentist with good quality and high gross practice wishes to specialize. Two fully equipped operating rooms are part of a large layout. Equipment may be purchased or not. Practice is available in September. Little or no money will be required down depending upon prospective buyer. Town is located a few miles from seashore with ideal hunting and fishing. Practice is well able to pay back investment in far less than a year. Prospect must write a full letter regarding himself. No curiosity seeking letters will be answered. Address A.D.A. Box No. 567.

•

MICHIGAN—For sale. Northwestern section lower peninsula. Attractive brick and stone, modern one story dental building. Room for combined offices or living quarters. Excellent opportunity, terms. Address A.D.A. Box No. 437.

MISSOURI—Modern dental offices for sale or will take dependable man in as associate on commission. Town of 20,000. Great opportunity, mostly new furnishings and equipment. Must have references. Dr. William J. Allen, State Bank Bldg., Poplar Bluff, Mo.

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MISSOURI—St. Louis. Modern dental office. For sale at sacrifice, because of sudden disability. Ideal location and good business. Low overhead. Will introduce. Convenient terms. Dr. Jack Y. Levin, 6187 Natural Bridge Rd., St. Louis 20, Mo.

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NEW JERSEY—Monmouth County. For sale. Two-chair, air-conditioned office. Rent $70 per month, 15 years old, well established. Moving out of state. $4,800 for immediate sale. Address A.D.A. Box No. 559.

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NEW YORK—Opportunity. Established and still growing community in Westchester County. Newly constructed, fully equipped office and adjoining apartment suitable for residence or further expansion. Address A.D.A. Box No. 560.

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NEW YORK—Brooklyn. Exclusive and convenient Park Slope. Ideal professional apartments; new eight story fireproof. Moderate rentals. Must be seen to be appreciated. Garage available. 130 Eighth Ave., (Cor. Carroll St.) See Mr. Bitker, Mgr., ST 9-2043 or phone office MU 2-0549.

•

NEW YORK—For sale or partnership, long established orthodontic practice. New York City. Excellent opportunity for capable orthodontist. Please send full details, and references in first letter. Replies confidential. Address A.D.A. Box No. 540.

•

NEW YORK—Dentist urgently needed. Suburban Syracuse, N. Y. Priced to sell. Have fully equipped modern office, active general practice in rapidly expanding community. Leaving for specialty. Address A.D.A. Box No. 554.

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NEW YORK—New York City. Exceptional opportunity for acceptable dentist. Fully equipped office, laboratory, etc. Professional building on 5th Avenue, 24 hour switchboard. Immediate occupancy. Will adjust part time or sell completely. Owner has suburban practice. Address A.D.A. Box No. 556.

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OHIO—For sale. Fully equipped, modern, spacious, one chair office with room for second chair. Located in shopping center in suburban community. Address A.D.A. Box No. 497.

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OKLAHOMA—For sale. Fully equipped two chair dental office. Comparatively new bungalow building, 900 square feet. Completely air-conditioned. Large drawing area. Will give full details on request. Address A.D.A. Box No. 561.

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PENNSYLVANIA—For sale. Active practice, established six years, beautiful, modern, air-conditioned office, one chair with room for second, good business neighborhood in northeast Philadelphia. Heavily populated. Dentist leaving city. Address A.D.A. Box No. 562.

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PENNSYLVANIA—For sale or lease. Immediate occupancy. Combination three bedroom brick home with second floor dental office and 35 year practice. Corner location, suburban Philadelphia—Delaware County. Two operating rooms with x-ray—completely equipped laboratory and dark room. Located near schools, business center and transportation services. Philip B. Driver, Jr., Attorney, 1018 Western Saving Fund Bldg., Philadelphia 7.

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VIRGINIA—Small town. Only dentist. Good practice. Office fully equipped in bungalow type of building. Returning to school in spring. Priced for quick sale. Dr. Henry S. Johnson, Jr., Box 337, Pocahontas, Va.

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VIRGINIA—Arlington. Practice for sale with modern equipment. Working only 3½ days a week, 6 hours a day with one month vacation. This practice is grossing about $25,000 annually. Possibilities are unlimited for energetic man. Room for second chair. Long lease available. Price $12,000. Address A.D.A. Box No. 555.

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MICHIGAN—Opportunity to join two young dentists in the practice of complete mouth general dentistry in a progressive southeastern Michigan city. Completely modern offices including dental hygienists and laboratory technician. Must be service exempt and preferably with some general practice experience. Here is a chance to enjoy dentistry with an above average income. Address A.D.A. Box No. 541.

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MINNESOTA—Oral surgeon wanted, especially qualified in general anesthesia. State age, marital status, military status, training, etc. Salary and percentage with potential association and partnership in three years. Address A.D.A. Box No. 542.

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COLORADO—The position of periodontist is open in the undersigned group, former periodontist having retired. The applicant for the position should be experienced but not necessarily certified by the American Board. Smedley Dental Group, 1206 Republic Bldg., Denver 2.

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FLORIDA—Miami Beach. Will form an association or partnership. Completely equipped modern two-chair office. Air-conditioned elevator building. Finest central location, main street. Lincoln Rd. Address A.D.A. Box No. 498.

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FLORIDA—Position as director of dental research clinic and teacher of course in dental assisting in Vocational High School, Jacksonville. Write to Dr. Neal M. Roth, 403 St. James Bldg., Jacksonville, Fla. No Florida license required.

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ILLINOIS—Associate or partner under 35 years of age. Latest equipment and new building in small suburb of Chicago. Fine opportunity for June graduate. Address A.D.A. Box No. 563.

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MARYLAND—Silver Spring. Full time associate general practice. Excellent opening for responsible operator with high income and incentive program. Five-day week —no evenings. Address A.D.A. Box No. 564.

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NEW JERSEY—Wanted: Associate for three chair office in Paterson suburb. Can progress to full partnership. Percentage with minimum salary. Give detailed qualifications and draft status. Also wanted: hygienist. Address A.D.A. Box No. 553.

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TEXAS—Dentist wanted. Will build and lease dental office. Write Lake Forest Medical Clinic, 9129 E. Houston Rd., Houston 28, Texas.

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ARKANSAS—Dental hygienist. Salary and commission. New modern office. Present hygienist leaving in April. Reason: marriage. Call or write Dr. Charles L. Craig, 526 Chickasawba Ave., Blytheville, Ark. Phone POplar 3-6881.

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CALIFORNIA—Wanted: Dental hygienist, licensed southern California. Full time. Guaranteed salary plus percentage. Bonus with paid vacation. Office in Beverly Hills area. Must be energetic and proficient. Address A.D.A. Box No. 543.

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TEXAS—Wanted: Dental hygienist. Profitable position. Address A.D.A. Box No. 565.

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Recent graduate with excellent private practice in East desires to relocate in Illinois. Will purchase a good practice or form association with high type ethical practice with arrangement to purchase practice from owner in event of forseeable future retirement. Highly adept in inlay and crown and bridge work. Only a practice of reasonably high gross will be considered unless the practice has outstanding quality and promise. Address A.D.A. Box No. 566.

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Chicago, Ill. or suburbs—dentist, age 27, completing military service June 1957 and entering graduate school in oral surgery in September 1957, desires part time affiliation with an established dentist. Illinois licensed and can give excellent references. Dr. Clarence D. Craig, 2525 Dover St., Augusta, Ga.

Iowa licensed dentist desires association with general practitioner or oral surgeon. Dental experience furnished on request. Address A.D.A. Box No. 568.

•

Oral surgeon desires association with well established oral surgeon. Five years limited practice and three years of residency in approved hospitals. M.S. degree in oral surgery. Military requirements completed. Address A.D.A. Box No. 569.

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Experienced dentist desires opportunity to represent pharmaceutical company, dental manufacturing company or dental supply company in Florida State. Address A.D.A. Box No. 570.

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New York licensed, 28, experienced in general practice, can handle periodontics and minor oral surgery. Completing military service in August. Desires association with dentist or group practice with opportunity for eventual partnership or purchase; in New York City or suburbs. Address A.D.A. Box No. 526.

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Dentist. National Boards, Kentucky licensed, seven years experience in high type general practice wishes to associate or purchase a high grossing practice in new location. Experience with gas and thiopental sodium. Military obligation fulfilled. Age 30, married. Will consider salaried position. Dr. Grover E. Conrad, 2604 Bardstown Rd., Louisville, Ky.

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Orthodontist—California licensed, university graduate school training, desires location or association. Military obligations completed. Dr. Sam F. Wallis, 809 S. Marshfield, Apt. 609, Chicago.

•

Wanted: Position or association in Chicago area. 1948 graduate, one year teaching experience, military requirements completed, specialized training in oral pathology, periodontics, surgery and general anesthesia. Address A.D.A. Box No. 546.

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Oral Surgeon—30 years of age, married, veteran. Three years A.D.A. approved excellent graduate training. Desires association or teaching in oral surgery. Will take any state board. Available July 1957. Dr. Ralph G. Grickenstein, 1664 Gerrard St., Speedway 24, Ind.

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European dentist, 7 years in western Canada, desires opportunity as sales representative for pharmaceutical company, dental manufacturing company, or any other related position not involving practicing. Address A.D.A. Box No. 539.

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Massachusetts licensed dentist interested in associating or establishing general practice. Age 28, married, military requirements completed. Finishing approved oral surgery and general anesthesia internship June 1957. Address A.D.A. Box No. 538.

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Midwestern veteran, 32, Indiana license, family, 5½ years private general practice with institutional and welfare experience. Desires salaried permanent position with future—no associations. Would consider research or health position. Address A.D.A. Box No. 537.

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Dentist, 32, military obligations fulfilled, changing residence to Florida, desires employment for 1-2 years, general practice experience, trained in full mouth rehabilitation. Offers and suggestions welcomed. Address A.D.A. Box No. 536.

New Jersey, New York licensed dentist, age 31, married and completing military tour July 1957. Capable general practitioner, good background in oral surgery, prosthetics and pedodontics. Desire association in above average dental practice. Dr. J. E. Nicoletti, 1 A Cunningham St., Westover A.F.B., Mass.

●

Ohio licensed dentist, 1955 graduate, completing military service in June 1957. Interested in purchase or association of practice in medium sized city or suburban community I am 27 and married. Address A.D.A. Box No. 557.

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Pennsylvania — Seven years' experience, busy general practice. One complete modern equipment. Completing military obligation in May 1957. Age 34, married, reliable. Interested in purchase or association in active practice. Address A.D.A. Box No. 513.

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California licensed dentist, age 26, married, one child. 1954 graduate of Northwestern University, rotating internship. Desires association in established general practice. Completing military service in June 1957. Address A.D.A. Box No. 525.

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Oral surgeon completing training July 1957. Desires association with well established oral surgeon. Licensed in Colorado and New Mexico, would take other boards. Three years oral surgery residency with M.S. Military requirements completed. Married, age 31. Address A.D.A. Box No. 516.

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Oral surgeon, 1947 graduate, service completed, graduate and hospital training including anesthesia. Four years private practice prior to service. Will take requisite state boards. Desires association with oral surgeon. Address A.D.A. Box No. 530.

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Old or used dental books, journals, prints. Leo L. Bruder, 1 DeKalb Ave., Dept. 21, Brooklyn, N. Y. Dealer in out-of-print dental literature.

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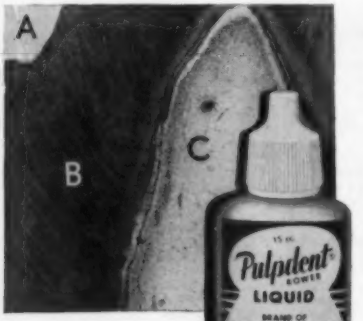
Wanted to buy. Used chair and unit in good condition. State how old, model, color, exact working condition, price. Address A.D.A. Box No. 552.



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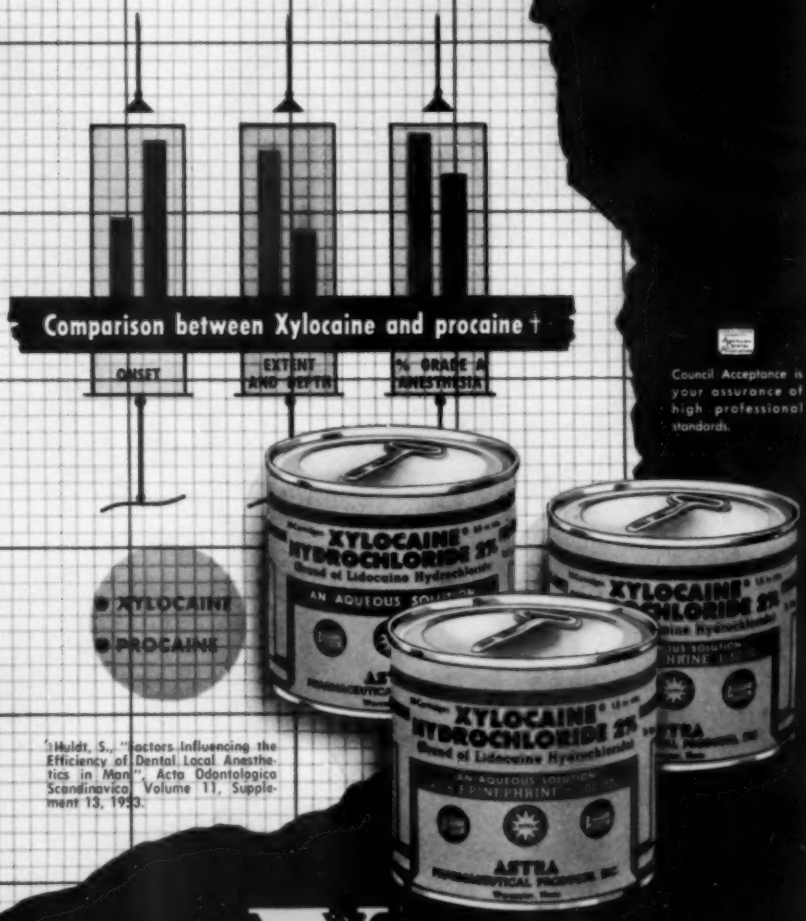

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†Huldt, S., "Factors Influencing the Efficiency of Dental Local Anesthetics in Man", Acta Odontologica Scandinavica Volume 11, Supplement 13, 1953.

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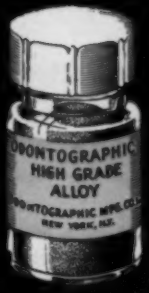

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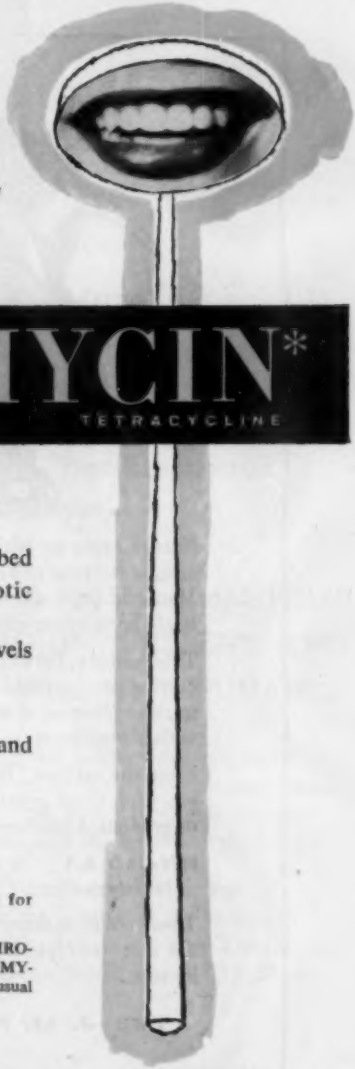

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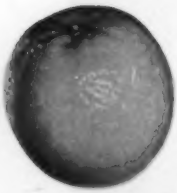
Since the National Casualty Company's plan of accident and health insurance is now in effect in New York, New Jersey, California, Utah and Nevada, the Association plan is not available in those states.



for your dietary advice to patients...

citrus sidelights on oral health

For formation of sound tooth structures, proper diet (including vitamin C-rich sources such as citrus) is essential in the prenatal period and later until the permanent dentition is completed.[1]

Liberal citrus intake daily provides vitamin C necessary for capillary and connective tissue integrity throughout the body including the periodontium.[2,3]

The detergent action of citrus fruits eaten at the end of meals promotes oral hygiene since during mastication they "literally sweep over the teeth, between the teeth, and over all the soft tissues."[3]

Florida Citrus Commission
Lakeland, Florida

1. King, C. G.: J. Am. Diet. A. 30:13, 1954.
2. Kelsten, L. B.: J. Dent. Med. 10:67, 1955.
3. Amer. Dent. Assoc.: Diet and Dental Health, Chicago, 1955, pp. 7-8.

A

Brand New

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ASTRA ASPIRATING SYRINGE

for **XYLOCAINE® dental cartridges**

. . . Aspirates at any point to give immediate warning of inadvertent intravascular depot. Stainless steel construction throughout. Light in weight, yet sturdy and durable. Balanced to fit within the palm — easily concealed from apprehensive eyes. The ideal companion to XYLOCAINE HCl,† a preferred choice when local anesthesia must be fast, deep, certain, SAFE.

LIGHTWEIGHT • DURABLE
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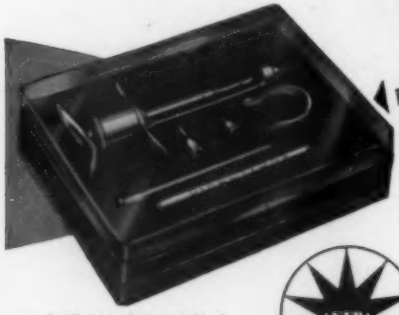

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Case includes —

1 Syringe
1 Thumb Grip Handle
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1 Short Hub
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1 Conventional Piston
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All parts made of stainless steel.

Available at recognized dental supply houses.

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The most accurate impression material ever offered!

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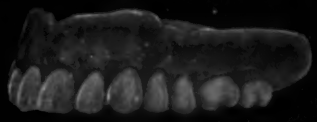

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All JECTRON dentures are now being delivered in this exclusive *Seal-Pack* bag —*insist* on this mark of JECTRON quality.

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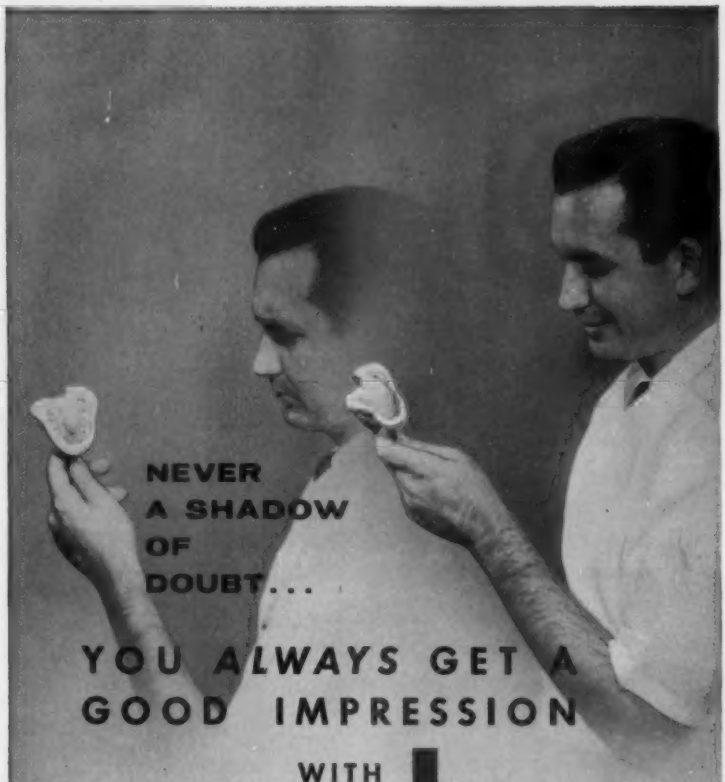
JECTRON is not an acrylic. It is a pre-cured styrene denture resin created through co-operative research by THE DOW CHEMICAL COMPANY and the JECTRON COMPANY



YOU ALWAYS GET A GOOD IMPRESSION WITH Jeltrate

This remarkable impression material works perfectly every time . . . in the mixing bowl, in the tray, in the laboratory. Uniform accuracy has made it dentistry's most widely used impression material.

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combines the dependability of hydrocolloids with the convenience of Jeltrate. Contrasting pink color.

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Ranchers brand their cattle for two reasons. One, for purposes of identification and, two, because they're proud of their herds. The Rinn "brand", too, is a symbol of pride . . . a sign of superiority and leadership gained through constant research and product improvement, a symbol that stands for uniformly high quality . . . uniformly better results.

When you specify the well-known Rinn brand you are assured of the finest radiographic results . . . time after time. Try Rinn products and see for yourself why the Rinn brand stands out. For information regarding the full Rinn line see your dental dealer or write to Rinn X-Ray Products, Inc., 2929 N. Crawford Ave., Chicago 41, Illinois.

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LEADERS IN DEVELOPMENT OF DENTAL X-RAY TECHNIQUES AND PRODUCTS

always asking

THE PROBLEM MAY BE THE PATIENT —NOT THE DENTURE!

As every dentist knows, though the denture be a work of prosthetic art, the patient may lack the ability, persistence and self-confidence to master its use without constant complaint. That's when a sympathetic attitude, supported by practical assistance, can lay the ghost of denture failure.

Thousands of dentists have found that Wernet's Powder can facilitate denture adaptation for such problem patients. The soft, resilient

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Please send me professional samples of Wernet's Powder.

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"Please Fix?"

cushion enhances stability and retention and increases self-confidence. New comfort, too, results from the absorption of sudden shocks and the distribution of unaccustomed pressures to less sensitive surfaces.

Patients with anatomical difficulties will find Wernet's Powder indispensable. All patients will appreciate the added comfort and security it affords.

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NET'S
POWDER

WERNET DENTAL LORE

MARCH, 1957

The evolution of "dental nursing assistant" to "dental hygienist" began in this country about 75 years ago. It was Dr. M. L. Rhein who first suggested in 1880 that women be trained to render prophylactic dental treatment; and Dr. Albert C. Fones of Bridgeport, Conn., who first acted on this suggestion, beginning with his own office assistant.

• • •

While 19th century dental practice was slow in many ways in taking advantage of contemporary scientific advances, it was far in the vanguard in its use of the Roentgen ray (X-ray). Only two weeks after the announcement of their discovery in 1895, X-rays were used in dental procedures by Otto Walkhoff of Munich. In this country they were first employed one year later (1896) by C. Edmund Kells.

• • •

The great humanist Erasmus of Rotterdam did not overlook dental considerations in his book of manners "De civilitate morum", first published in 1539, which ran through 50 editions in 6 years. In it he criticized the common habit of picking the teeth at table with a knife, a fingernail, or a napkin—recommending instead a small mastic stick, a quill, or a chicken bone.

• • •

One of the most precious relics of Buddhism—the sacred tooth of the great religious teacher Gautama Buddha—has been retained in India only with the greatest of difficulty. Seized and destroyed by the Portuguese in the 15th century, it was replaced by the Khan with one of ivory twenty times oversize, housed in a palace in the remote hills. This in turn was stolen during wars with the Portuguese, the Dutch and the British. Since 1915 the Indians have found the means of retaining that sacred tooth safely and securely . . . a symbol (we may imagine) of the enhanced retention which India today affords denture wearers, because their country provides Gum karaya, basic ingredient of Wernet's Denture Powder.

Eliminates four major impression problems!

new **R•28**

ALL PURPOSE

RUBBER BASE IMPRESSION MATERIAL

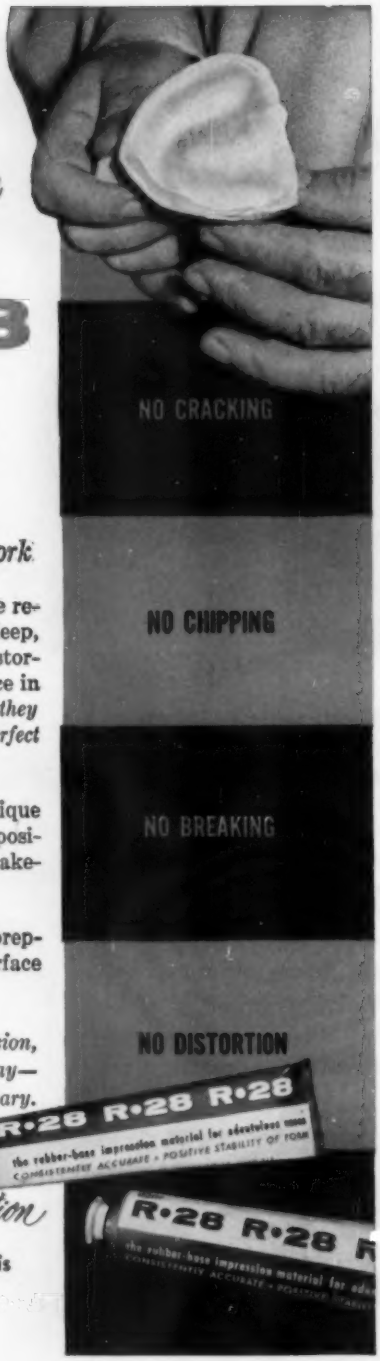
**Full Dentures*
**Inlays*
**Bridgework*

New, elastic R-28 impressions can easily be removed from any undercut, no matter how deep, with no cracking, chipping, breaking or distortion. And you can have complete confidence in the accuracy of your R-28 impressions—*they literally snap back to their original detail-perfect shape.*

R-28 saves you time and trouble. Its unique combination of accuracy, flexibility and positive stability of form reduces the need for make-overs and increases patient satisfaction.

Easy to use, R-28 requires a minimum of preparation, hardens quickly with a smooth surface and is tasteless and odorless.

Also excellent as a corrective impression, using the old denture as a tray—no adhesive necessary.



W G

The William Getz Corporation

7512 South Greenwood, Chicago 19, Illinois

To the future...

A young woman needs the help of those concerned with human welfare . . . to build and maintain a healthful future for herself and her children.

A good diet is needed before pregnancy to insure optimum growth of all tissues and adequate storage of calcium in the skeleton . . . and during pregnancy to prevent any undue nutrient loss from maternal tissues, and to permit storage of nutrients in the body of the growing infant. Nutritional supplements are generally neither effective nor economical substitutes for a good diet and do not provide opportunity for correction of faulty eating habits. Their use without evidence of deficiencies requires critical appraisal by obstetricians, according to conclusions of a team of scientists who studied dietary intakes of more than two thousand pregnant women, evaluating health and nutritional status of mothers and infants.

Among 404 pregnant women on marginal diets, incidence of prematurity was found to be greater among those whose nutrient intakes were lowest. Of 227 mothers whose diets were rated best, 4 per cent of the infants were premature. Of 177 mothers whose diets were rated poorest, 9.6 per cent of the infants were premature. The diets of these women were particularly low in calcium because of a low milk intake.

Four cups of milk each day during pregnancy . . . and six cups during lactation . . . to drink . . . used in food preparation . . . as cheese or ice cream . . . will provide most of the calcium needs of these reproductive periods . . . and generous quantities of high quality protein and other essential nutrients.

In planning meals for the mother-to-be, *milk and milk products are foundation foods for good eating and good health.*

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

Since 1915 . . . promoting better health through nutrition, research and education.

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A non-profit organization
111 N. Canal Street • Chicago 6, Ill.

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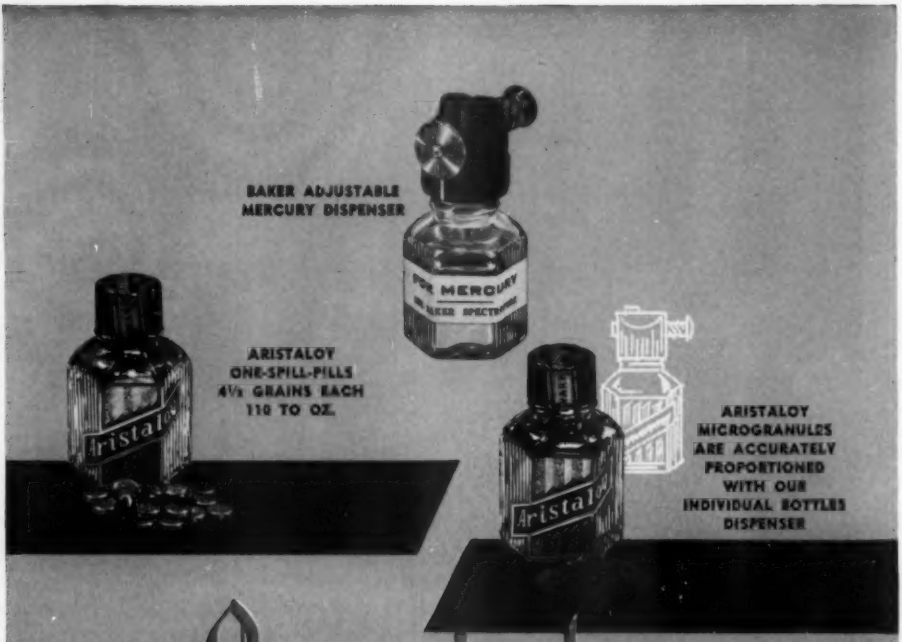

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Aristaloy

LOOSE MICROGRANULES OR ONE-SPILL-PILLS

Aristaloy in One-Spill-Pills take no longer to amalgamate since they are the regular selected assortment of Aristaloy particles (with nothing added) lightly pressed together for quick, easy proportioning.

Each Pill requires one Spill of Mercury from the Baker Adjustable Dispenser.

Ask your Dealer for a Pre-Proportioned Combination 10 ounces of Aristaloy in One-Spill-Pills, complete with Mercury Dispenser.

Are you continually experimenting with new unproven alloys, while *proven* Aristaloy is conveniently available.

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SUPERIORITIES!

- Great strength—a solid block of porcelain.
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- *Functional* anatomy . . . for better mastication, and for simpler articulation.
- Easily adapted—no hidden mechanics.
- Standardized to facilitate replacement.
- Perfectly suited to all of the various designs of cast metal cases. *No new technic.*

**Bioform is the Trade-Mark of Dentists' Supply Company.*

The Columbus Dental Mfg. Co.
Columbus 6, Ohio

Steele's
SIDE-GROOVE
Posteriors

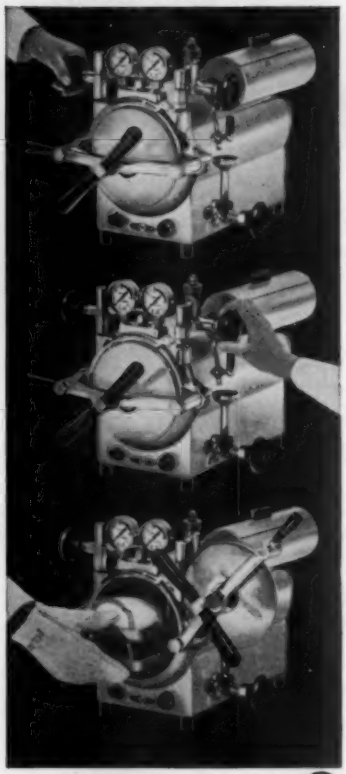
Better: for the patient, the Dentist, the technician

WHY BOIL?

when you can sterilize FASTER and SAFER in the

PELTON AUTOCLAVE

So Easily Operated



TRANSFER
After loading, simply transfer steam from reserve to sterilizing chamber. In only a few seconds, temperature is attained.

DISCHARGE
When sterilization is completed, discharge steam to condenser after closing transfer valve and crack open the door.

UNLOAD
In a minute or two entire contents are removed completely sterile and dry. The autoclave is ready for second load.

AVAILABLE IN 3 SIZES:

Model FL-2,
6" x 12" sterilizing chamber

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8" x 16" sterilizing chamber

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Model LV-2,
12" x 22" sterilizing chamber

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the Pelton & Crane company
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Gentlemen: I am interested in the Pelton time-saving Autoclave. Please send me more information and prices on model.

☐ FL-2 ☐ HP-2 ☐ LV-2

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Pentids...
proved by five years' experience in millions of cases ...millions of doses

adjunctive therapy for the more common dental infections

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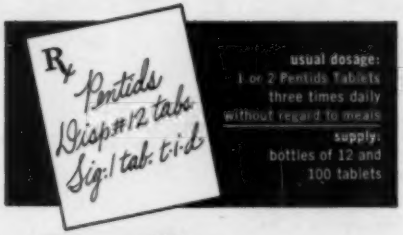

usual dosage:
1 or 2 Pentids Tablets three times daily without regard to meals

supply:
bottles of 12 and 100 tablets

Natural Bristle Brushes Available:
Squibb Angle Toothbrushes, 2 or 3 row natural bristle, are available for your patients at all pharmacies.

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Chief of the Division of Oral Surgery, University of Tennessee College of Dentistry
AND CONTRIBUTORS

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Sugarless Mints

REFRESHING MINT FLAVOR!

Deliciously sweet, but free from sugar. Available through drug, department and health food stores.

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DISPOSABLE SALIVA EJECTORS

Smooth rounded lip assures comfort

Small relief holes eliminate tissue sucking

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Adaptable to individual patient requirements

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DENTAL DIVISION

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A-76

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DENTAL AUTHORITIES stress the importance of optimal nutrition in the aim toward better dental health during the early growth years. Oatmeal, with its wealth of essential nutrients, not only contributes broadly to good nutrition, but—since its carbohydrate is not readily degraded to simple fermentable sugars—is of virtually no cariogenic influence.

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Oatmeal, because of its eye appeal and pleasing taste, stimulates the flow of salivary and gastric secretions. Softly particulate in form, it is readily miscible with the digestive juices and presents a large surface area to enzymatic action, thus yielding rapidly to gastric and intestinal digestion.

Oatmeal promotes comfort and efficiency of digestion throughout the gastrointestinal tract. The small amount of cellulosic material apparently aids in the breaking up of the compact gelatinous food mass in the stomach, thus facilitating gastric emptying.[3]

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1. Merrill, A.L., and Watt, B.K.: Energy Value of Foods ... Basis and Derivation, United States Department of Agriculture, Human Nutrition Research Branch, Agricultural Research Service, Agriculture Handbook No. 74, March 1955, pp. 8, 9, 25, 32-43, 60-87.
2. McCance, R.A., and Glaser, E.M.: The Energy Value of Oatmeal and the Digestibility and Absorption of Its Proteins, Fats and Calcium, Brit. J. Nutrition 2:221 (1948).
3. McLester, J.S., and Darby, W.J.: Nutrition and Diet in Health and Disease, ed. 6, Philadelphia, W.B. Saunders Company, 1952, pp. 189-190.

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SPECIAL COLOR-GARD FINISH applied at 140° resists medicinal stains.

STEEL DRAWERS with wood exteriors glide smoothly, quietly. Won't jam or sag. Glass trays.

BALL BEARING ROLLERS. Nylon covered for smooth, quiet, easy operation. 4 on each drawer.

MEDICINE COMPARTMENT. Exclusive roll-back. Easily opens with cabinet flush to wall.

. . . and at a remarkably low price.

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BEAUTIFUL CANADIAN OAK with natural grain finish, color keyed to **perfectly** match your other equipment. Also available in **all** Formica finish.

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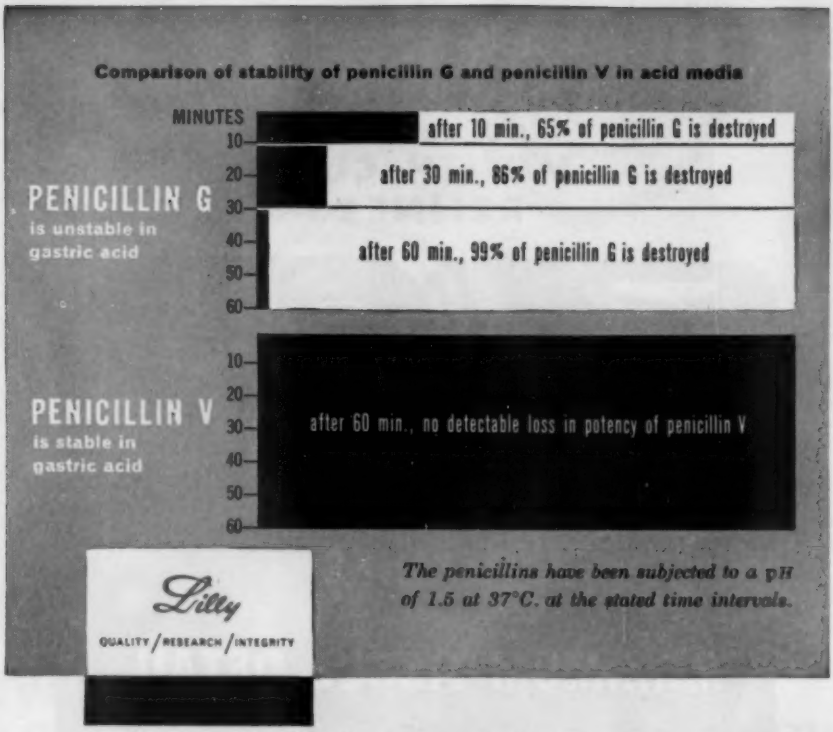
Children whose mothers keep apples on hand have less trouble with spoiled appetites and unclean teeth through the day.

In addition to the familiar values of apples, their natural tooth-cleansing action and outstanding usefulness in the early establishment of eating habits conducive to caries control are significant to physicians and dentists alike.

FILM "Gateway to Health," 16 mm., color, sound, 20 min., showing influence of dietary habits on dental health: Available from JADA film library, numerous local and state dental societies, state health departments; or write to address below. POSTER with above illustration will be mailed on request.

THE APPLE GROWERS OF AMERICA: NATIONAL APPLE INSTITUTE, 726 JACKSON PLACE, WASHINGTON 6, D. C.


Comparison of stability of penicillin G and penicillin V in acid media
MINUTES
10
20
30
40
50
60
PENICILLIN G
is unstable in gastric acid
after 10 min., 65% of penicillin G is destroyed
after 30 min., 86% of penicillin G is destroyed
after 60 min., 99% of penicillin G is destroyed
PENICILLIN V
is stable in gastric acid
after 60 min., no detectable loss in potency of penicillin V
Lilly
QUALITY / RESEARCH / INTEGRITY
The penicillins have been subjected to a pH of 1.5 at 37°C. at the stated time intervals.

more dependable oral penicillin

V-CILLIN

(Penicillin V, Lilly)

produces 50 to 100% higher blood levels

'V-Cillin' gives you the greatest assurance of successful oral penicillin therapy. It is acid stable. Penicillin V is the only penicillin that passes through your patient's stomach without loss of potency and is rapidly absorbed in the duodenum.

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Supplied: Pulvules, 125 mg. (200,000 units)

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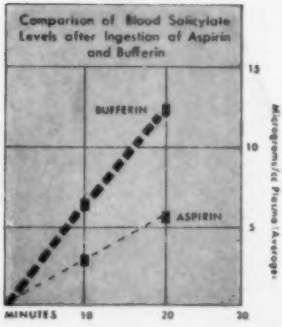
GIVE YOUR PATIENT FASTER PAIN RELIEF with BUFFERIN®



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